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ABSTRACT

This dissertation report, stemming from research and curriculum development activities of the Anthropology Curriculum Project, investigates the facilitative effects of pre-organizers, post-organizers, and no-organizers on the learning of anthropological concepts in the third grade. The investigation was an outgrowth of interest in Ausubel's theory of meaningful, verbal reception learning. It was hypothesized in this study that there are no statistical differences among the adjusted mean scores of groups using materials with pre-organizers, post-organizers, and no-organizers. A student textbook, "The Changing World Today: Case Studies of Modernization in Japan, Kenya, and India," was written in three formats. In one format the organizer preceded the learning passage (pre-organizer), in another the organizer followed the learning passage (post-organizer), and in the third format only the learning passage (no-organizer) was presented. Twenty third grade classes served as the experimental population from which the classes were randomly assigned to three groups. The study was unable to produce evidence supporting the hypothesis that either pre- or post-organizers facilitate learning of structured anthropology materials at the third grade level. A related document is SO 005 662. (Author/SJM)

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A COMPARISON OF THE EFFECTS OF ORGANIZERS ON THE LEARNING OF STRUCTURED ANTHROPOLOGY MATERIALS IN THE THIRD GRADE

by

ELMER ULMONT CLAWSON

A.B., Sacramento State College, 1957
M.A., Sacramento State College, 1965
M.A., University of Colorado, 1969

SO 005 663

A Dissertation Submitted to the Graduate Faculty

of the University of Georgia in Partial Fulfillment

of the

Requirements for the Degree

DOCTOR OF EDUCATION

Athens, Georgia

1972

ANTHROPOLOGY CURRICULUM PROJECT
UNIVERSITY OF GEORGIA / 107 DUDLEY HALL / ATHENS, GEORGIA 30601

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This effort is dedicated to my family.

FORWARD

The present study is part of the research and curriculum development activities of the Anthropology Curriculum Project at the University of Georgia. Two sets of curriculum materials, The Changing World Today: Case Studies of Modernization in Japan, Kenya, and India, at the third-grade level, and Cultural Change in Mexico and the United States, at the sixth-grade level, were developed between 1970-1972.

In an effort to investigate the facilitative effects of organizers on the learning of anthropological concepts in the elementary grades, two studies were planned and conducted. The present dissertation is a report of the third-grade study. For a report of the sixth-grade study see "The Effects of the Position of Organizers to Facilitate Learning of Structured Anthropology Material in the Sixth Grade" by Buckley R. Barnes, an unpublished doctoral dissertation, University of Georgia, 1972.

The planning phase of the two studies was jointly carried out by the two investigators. Three sections of the two dissertations: background to the study, review of the literature, and recommendations for further research were written jointly. Both studies were conducted in the Savannah-Chatham County Public Schools.

The studies differed in that the present study consisted of three treatment groups: pre-organizers, post-organizers, and no-organizers, while the sixth-grade study consisted of two treatments: pre-organizers and post-organizers.

Neither study produced evidence to support the hypothesis that pre-organizers facilitate learning of structured anthropology materials in the elementary grades.

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CHAPTER I

BACKGROUND TO THE STUDY

The present study evaluating the effectiveness of the use of organizers in written materials is a result of the investigator's participation on the staff of the Anthropology Curriculum Project at the University of Georgia. This Project was funded by the United States Office of Education from 1964-1969 to develop and field test a sequential curriculum in anthropology for grades one to seven. Since 1969 the Project has been carried on under the auspices of the College of Education, University of Georgia. The focus of the Project materials is on the mastery and application of fundamental concepts from anthropology (Rice & Bailey, 1971).

Project materials fall within the realm of subject curriculum (Rice, 1971). The two distinctive characteristics of the subject curriculum, as defined by Smith, Stanley, and Shores are:

> ...the content is chosen and organized in accordance with the needs of the scientist or research specialist, who is interested in the subject for 'its own sake' and consequently orders facts and principles so as to render them most useful in conducting further research in the subject.

> ...this curriculum emphasizes expository discourse and techniques of explanation. ...in which ideas are stated and elaborated so that they may be understood [Smith, Stanley, & Shores, 1957, pp. 231, 233].

Ausubel's theory of meaningful, verbal reception learning (Steinbrink, 1970) and Carroll's Mastery Learning Model (Gaines, 1971) have been used as guides in the development and field testing of recent Project materials. These theories seemed to fit into the subject curriculum pattern and offered structures that were purported to enhance learning.

The present study is an outgrowth of the Project Staff's analysis of Ausubel's theory of meaningful, verbal reception learning. The investigator planned to use three elements of Ausubel's theory; the advance organizer, progressive differentiation, and integrative reconciliation in the development of the curriculum materials used in the present study. Two of these three elements presented no problem and were used in the development of the materials according to the criteria set forth by Ausubel. These were the concepts of progressive differentiation and integrative reconciliation.

Progressive differentiation refers to the organization of the instructional sequence. It begins with the most general and inclusive ideas followed by a more detailed and specific explanation. The purpose of organizing materials in this manner is to provide the learner with a way of organizing and categorizing phenomena.

Integrative reconciliation refers to the process of explicitly exploring relationships between new and previously taught concepts. Its purpose is to point out significant similarities and differences, to clarify real differences, and to reconcile apparent inconsistencies among concepts.

Problems were encountered when the investigator attempted to write advance organizers according to Ausubel's criteria. These criteria were not operationally defined by Ausubel. Therefore, the investigator defined and constructed his own organizers. The organizers used in the present study are more abstract, general, and inclusive than the learning task itself and they provide the learner with organizing elements that take into account the particular content contained in the learning task. They are similar to the expository organizer described by Ausubel (1963, p. 83) which are appropriate when presenting learners with concepts that are unfamiliar. Expository organizers present unfamiliar concepts to learners in simple rather than complex terms and are used to present the learner with organizing elements that will facilitate the learning of the concepts. The expository organizer does not rely upon making connections with the previous cognitive structure, as is the case of subject matter with which the student has some previous knowledge. In such cases a comparative organizer, which takes into account the learner's previous knowledge and associations, is more appropriate than an expository organizer (Ausubel, 1963, p. 83). No claim is made that the organizers used in the present study meet all of the organizer criteria espoused by Ausubel.

Statement of the Problem

The present study was designed to compare the effects of the position of an organizer on the learning and retention of structured anthropology materials in grade three. The treatment unit consisted of the first three chapters, Culture, Cultural Change, and Industrialization and Modernization in Japan, from the student textbook, *The Changing World Today*: *Case Studies of Modernization in Japan*, *Kenya*, *and India*, Publication Number 72-1, Anthropology Curriculum Project, University of Georgia.

The question to be answered in the study was: Are there significant differences in learning among the treatment groups using an organizer placed immediately before each learning passage (pre-organizer), the treatment group using an organizer placed immediately after each learning passage (post-organizer), and the treatment group using only the learning passage (no-organizer)?

Definition of Terms

The concept of the organizer was of particular importance in the present study, and a clear definition of it was considered essential. During the initial stages of the study the investigator attempted to differentiate between Ausubel's definition of the advance organizer and an introductory overview. This attempt was dropped because it was not possible to differentiate between the two. While logical distinctions could be drawn between written criteria for the organizer and overview, several critics raised the question that these distinctions might not translate into practice. The practical distinctions were tested when the investigator wrote an organizer and an overview according to the criteria. The organizer was more abstract, general, and inclusive than the material in the learning passage that followed, and it was formulated in the language, concepts, and propositions that were presumed to be familiar to the learner. The overview was written at the same level of abstraction, generality, and inclusiveness as the learning passage that followed.

Two judges, a graduate student and a professor in the Department of Social Science Education at the University of Georgia, were asked to identify the organizer and the overview on the basis of the written criteria. They were unable to correctly identify either passage. One of the judges reported that the organizer seemed less abstract than the overview because it was written in the language, concepts, and propositions presumed to be familiar to the learner. The other judge reported that the overview seemed to be as abstract, general, and inclusive as the organizer because both were shorter than the learning passage yet contained the key ideas of the learning passage.

Ausubel only briefly differentiated between the organizer and the overview (Ausubel, 1963, p. 214; 1968, pp. 330-331). He frequently used the term overview when defining the attributes of the organizer (Ausubel, 1963, p. 82).

The attempt to distinguish between organizer and overview, applying Ausubel's criteria, was therefore abandoned as not having functional utility for the writing of the present curriculum materials.

Because Ausubel did not operationally define the organizer, the investigator devised his own criteria for the organizer and attempted to write them in operational terms. Therefore, no claim is made that the organizers in the present study meet all of Ausubel's criteria. The study attempted to determine whether organizers, as defined below, facilitate learning.

Organizer refers to written material that serves the function of facilitating the incorporation and retention of subject matter. The organizer provides a brief summary of the more detailed material contained in the learning passage.

The written organizers used in the present study had the following characteristics:

1. presented in narrative expository paragraphs the key concepts of the discipline which were explained in detail in the unit;
2. defined the key concepts in simple rather than complex language;
3. illustrated the key concepts with examples which were further developed and enlarged in the unit;
4. introduced the key concepts, with supporting definition, illustrative, and relational material, in the sequence which the concepts were developed in the unit;
5. arranged the narrative sequence to develop key

concepts on the basis of generality and subsumption (major and minor concepts in a cluster, or congerie of related concepts);

6. provided a narrative condensation of the major ideas in the unit;

7. in a terminal position, served as a summary of the unit.

In the review of the literature there are a number of other specific terms that are identified with Ausubel's theory and that pertain to and have importance in the present study.

Cognitive structure is the stability, clarity, and organization of the learner's subject matter knowledge in a given discipline (Ausubel, 1963, p. 76).

Integrative reconciliation is the process of explicitly exploring relationships between new and previously taught concepts (Ausubel, 1963, p. 80).

Progressive differentiation is the sequencing of subject matter beginning with the most general and inclusive ideas first and then followed by a more detailed and specific explanation (Ausubel, 1963, p. 74).

Reception learning is a type of learning in which the task (material to be learned) is presented to the learner rather than independently discovered by the learner

(Ausubel, 1963, p. 1).

Verbal learning is used here in a general sense and is inclusive of written as well as oral understanding of symbolic learning (Ausubel, 1963, p. 1).

This discussion of terminology, especially that of organizer, is pertinent to the review of literature and the need for this study, presented in the next chapter.

CHAPTER II

REVIEW OF THE LITERATURE

Ausubel's Theory of Meaningful, Verbal Reception Learning

The role of the advance organizer can best be understood in the context of Ausubel's theory of meaningful, verbal reception learning. Ausubel (1963, pp. 28-29) listed three principal variables influencing meaningful, receptive learning: 1) the availability, within the learner, of relevant subsuming concepts at an appropriate level of inclusiveness to provide optimal anchorage within the cognitive structure; 2) the extent to which new material is discriminable from the established conceptual system that subsumes it; and 3) the stability and clarity of the subsumers within learners which affects the longevity of new meaningful material in memory.

Ausubel's (1963, p. 24) theory of cognitive organization assumes the existence of a cognitive structure of the learner that is hierarchically organized in terms of highly inclusive conceptual traces under which are subsumed less inclusive subconcepts as well as specific informational data. The major organizational structure is that of progressive differentiation of a given sphere of knowledge from greater to lesser inclusiveness. The theory includes the assertion that existing cognitive structure is the major factor affecting meaningful learning and retention, and that the acquisition of an adequate cognitive structure has been shown to depend on both substantive and programmatic factors. Substantive factors refer to using for organizational and integrative purposes those substantive concepts and principles that have the widest explanatory power, inclusiveness, generalizability, and relatability to the subject matter content of that discipline. The programmatic factors include the ordering and sequencing of subject matter that best enhance the clarity, stability, and cohesiveness of cognitive structure.

In the theory of meaningful verbal learning a key premise is the assertion that substantive aspects of unfamiliar concepts or information must be related to existing concepts in the cognitive structure. The major factor affecting meaningful learning and retention is the learner's existing cognitive structure. Potentially meaningful material is only meaningful when related to an already existing cognitive structure. The cognitive structure of the particular individual must include the requisite intellectual capacities, ideational content, and experiential background. It is on this basis that the potentially meaningful material varies with such factors as age, intelligence, and cultural background. It is subsumability within or incorporability by a particular cognitive structure which gives meaning to instructional materials (Ausubel, 1963, p. 23).

Ausubel distinguished between rote and meaningful learning. He characterized rote learning tasks as those tasks which are related to the cognitive structure but only in an arbitrary, verbatim fashion which does not permit the incorporation of derivative, elaborative, supportive, correlative, or qualifying relationships within a relevant system of hierarchically organized ideas and information (Ausubel, 1963, pp. 41-42). He suggested the following as the more flagrant practices which rely on rote verbal learning: 1) premature use of verbal techniques with cognitively immature pupils; 2) arbitrary presentation of unrelated facts without any organizing or explanatory principles; 3) failure to integrate new learning tasks with previously presented materials; and 4) the use of evaluation procedures that merely measure ability to recognize discrete facts, as to reproduce ideas in the same words or in the identical content as originally encountered (Ausubel, 1963, p. 18).

In contrast, meaningfully learned materials are related to existing concepts in the cognitive structure in nonarbitrary ways which makes possible the understanding of various kinds of significant (e.g., derivative, qualifying, correlative) relationships.

The relative level of abstraction of subject matter content becomes an important pedagogical consideration in determining at what level pupils are introduced to different subject matter. Bruner (1960, p. 1) cautioned that in devising instruction for the young, one would be ill-advised to ignore what is known about growth, its constraints and opportunities. Jean Piaget has contributed much research on the study of cognitive processes. Piaget's theory is developmental; he contends that the thinking of all children tends to go through the same stages, and, on the average, when they are the same age. Children in the third grade normally fall within the age span of seven to nine which Piaget identifies as the concrete operations stage. This stage is characterized as the stage in which the child uses logical operations, but the content of his thinking is concrete rather than abstract (Stendler, 1966, pp. 7-13).

Ausubel recognized these developmental processes and developmental stages and cautioned that during the concrete stage, which roughly covers the elementary school period, children are restricted by their dependence on concrete empirical experiences to a semi-abstract, intuitive understanding of abstract propositions. He pointed out that such learners cannot meaningfully comprehend verbally or symbolically expressed propositions without the aid of concrete-empirical props (Ausubel, 1963, p. 146). There is little disagreement that readiness influences the efficiency of the learning process and often determines if an intellectual skill or type of school material is learnable at all at a particular stage of development. Readiness is a function of both general cognitive maturity and of more particularized learning experience (Ausubel, 1963, p. 134).

The concept of readiness refers to the adequacy of existing capacity to handle a learning task. Whether or not readiness exists depends on both maturation and prior learning experience. Maturation is not the same as readiness but merely one of the two principal factors (the other being learning) that contributes to or determines the organism's readiness to cope with new experiences (Ausubel, 1963, p. 32).

It was Ausubel's contention that at any given stage in the learner's differentiation of a particular sphere of knowledge it is unlikely that the teacher can depend on the spontaneous availability of the most relevant subsuming concepts. He further contended that the most efficient way of facilitating retention is to introduce appropriate subsumers prior to the actual presentation of the learning task (Ausubel, 1963, p. 29).

Ausubel's concept of introducing subsumers prior to instruction is not substantially different from that of Herbart and Morrison. They had earlier hypothesized that providing students with relevant information prior to instruction facilitates learning. The nineteenth century philosopher Herbart believed that the teacher should not present anything completely new to the student. He cautioned that the teacher must provide the learner with connecting links to that which has been previously taught (Compayré, 1907, p. 59). This should be done, he advised, bit by bit to widen the student's circle of thought, taking careful account of the precise structure of that particular child's mind at each point (Dunkel, 1970, p. 13).

> He [the teacher] will announce and recapitulate beforehand what is going to be said, and also going to be read . . . in popular language, avoiding the use of too many new and technical words . . . Thus the intellect of the pupil, inclined in the right direction, will be disposed to listen, and the instruction, thrown on to a well-prepared soil, will bear the fruit which he expected [Compayré, 1907, p. 62].

In a subsequent consideration of the introduction of new materials, Morrison pointed out that new ideas must have a point of connection in the existing experience of the learner, and that it is probably impossible to acquire new ideas or abilities without this connecting link. He advised that new materials be introduced to students with a sketch containing the essence of the matter with a minimum of detail (Morrison, 1926, pp. 248-249).

Ausubel (1963, p. 29) concurred that the most efficient way to facilitate retention is to introduce organizers prior to the actual presentation of the learning task. The introductory materials thus become advance organizers for the reception of new material.

An understanding of Ausubel's concept of the advance organizer is crucial in understanding his theory of meaningful, verbal reception learning. He stated:

> The strategy advocated in this treatise for deliberately manipulating cognitive structure so as to enhance proactive facilitation or minimize proactive inhibition involves the use of introductory materials (i.e., organizers) prior to the presentation of the actual learning task. These advance organizers consist of introductory material at a higher level of abstraction, generality, and inclusiveness than the learning task itself. The function of the organizer is to provide ideational scaffolding for the stable incorporation and retention of the more detailed and differentiated material that follows in the learning passage, as well as to increase discriminability between the latter and related, interfering concepts in cognitive structure [Ausubel, 1963, p. 29].

Ausubel further clarified the characteristics of the advance organizer by stating that:

> The advantage of deliberately constructing a special organizer for each new unit of material is that only in this way can the learner enjoy the advantage of a subsumer which both (a) gives him a general overview of the more detailed material in advance of his actual confrontation with it, and (b) also provides organizing elements that are inclusive of and take into account most relevantly and efficiently both the particular content contained in this material and relevant concepts in cognitive structure. It thereby makes use of established knowledge to increase the familiarity and learnability of new material [Ausubel, 1963, p. 82].

Ausubel (1963, p. 214; 1968, pp. 330-331) attempted to distinguish between organizers and overviews or summaries commonly found in textbooks. Overviews and summaries are typically written at the same level of abstraction and generality as the learning materials and accomplish their effects through repetition, selective emphasis on key words or central concepts; in contrast, organizers are written at a higher level of abstraction and generality, and provide relevant subsuming concepts.

The present investigator attempted to operationally differentiate between advance organizers and introductory overviews but found it difficult to understand the concept of abstraction as discussed by Ausubel. Nowhere does he define the term operationally or give specific illustrations. In one context he stated that the advance organizer is to be more abstract than the material that follows while at the same time it is to be formulated in terms of language, concepts, and propositions already familiar to the learner with appropriate illustrations (Ausubel, 1963, p. 214). It would appear that these two criteria are contradictory, one being abstract and the other concrete.

Two types of advance organizers were defined by Ausubel (1963, p. 83). In the case of completely unfamiliar material, an expository organizer is used to provide subsumers that primarily furnish ideational anchorage in terms that are familiar to the learner. In the case of relatively familiar material, a comparative organizer is used to 1) integrate new concepts in cognitive structure and 2) to increase discriminability between new and existing concepts which are essentially different but confusable.

While Ausubel discussed these two types of organizers in general terms, he did not define them operationally. Further, he did not use specific examples with illustrative material. As a result, the concept of the advance organizer remains vague.

Related Research

A review of research pertaining to advance organizers indicates that most studies have 1) reported conflicting results as to the facilitative effect of advance organizers, 2) not attempted to operationally define the concept of advance organizer, 3) investigated the effects of the advance organizer at the college level, 4) been designed to limit classroom interaction during the study, 5) been of a short duration; from one to four class periods, and 6) not been in social studies. A summary of these studies is reported in Table 1. Studies are organized according to findings: those finding significance in favor of written organizers and those finding no significance in favor of written organizers. Studies using multi-media organizers are presented separately from those using written organizers.

Studies reporting facilitative effects of advance organizers. There is a body of research evidence supporting the contention that advance organizers do, in fact, facilitate learning. Ausubel (1960), using 120 college seniors in educational psychology as subjects, compared a 500 word expository advance organizer with an historical passage of the same length. Both introductory passages and the learning passage dealt with metallurgy, a topic

TABLE 1

Previous Investigations of the Facilitative Effects of Organizers

Studies Reporting a Facilitative Effect of Advance Organizers

Investigator	Year	Type of Organizer	Number of Subjects	Level and Subject Area	Length of Study	Results
Ausubel	1960	Expository vs. historical passage	120	College: Metallurgy	1 class period	Non-sig.; pre-organizer almost sig. at .01.
Ausubel and Fitzgerald	1961	Expository, comparative, and historical introduction	155	College: Religion	3 class periods plus posttest and delayed posttest	Comparative organizer sig. .05 on posttest. Both organizers sig.: expository .05, comparative .02 on delayed posttest (10 days).
Ausubel and Fitzgerald	1962	Expository vs. introductory passage	143	College: Endrocrinology of Pubescence	2 class periods	Total group non-sig. When blocked by SCAT verbal ability scores, sig. .01 in favor of organizer with students in lower one third group.

TABLE 1 (Cont'd)

Investigator	Year	Type of Organizer	Number of Subjects	Level and Subject Area	Length of Study	Results
Ausubel and Youssef	1963	Advance organizer vs. historical and biographical passage	162	College: Religion	30 minutes per day for 4 days	Organizer sig. .01 when verbal ability held constant. When knowledge of Christianity held constant, advance organizer was sig. .05.
Groteluescher and Sjogren	1968	Earlier version of the organizers used below	48 Graduate Education Students	College: Mathematics	1 individually arranged session	Advance organizers facilitated learning especially when materials were presented in a partially sequenced manner.
Groteluescher and Sjogren	1968	Three experimental organizers and one historical	24 gifted adults	Adults: Mathematics	1 individually arranged session	Advance organizers facilitated learning especially when materials were presented in a partially sequenced manner.

TABLE 1 (Cont'd)

Investigator	Year	Type of Organizer	Number of Subjects	Level and Subject Area	Length of Study	Results
Allen	1969	Advance organizer vs. introduction	212	Junior High: Social Studies	4 days	Advance organizer facilitated learning of above-average students on the delayed posttest (3 weeks).
Neisworth and others	1969	Advance organizer vs. motivational introduction	184 at each level	Normal Elementary and EMR Adolescents: Science	4 days	Advance organizer sig. on posttest and delayed posttest (14 days) with normal elementary. No. sig. difference among EMR adolescents on posttest or delayed posttest.
Steinbrink	1970	Daily advance organizer vs. no daily advance organizer	156	Elementary: Social Studies	5 weeks	Advance organizer sig. on posttest.

TABLE 1 (Cont'd)

Studies Reporting No Facilitative Effects of Advance Organizers

Investigator	Year	Type of Organizer	Number of Subjects	Level and Subject Area	Length of Study	Results
Woodward	1966	Advance organizer and post-organizer	27	College: Mathematics	?	Non-sig.
Bauman, Glass and Harrington	1969	Advance, post- and no-organizer	34	College: Psychology	1 class period	Post-organizer sig. .05.
Bauman, Glass and Harrington	1969	Advance, post- and no-organizer	21	College: Statistics	1 class period	Post-organizer sig. .005 when advance and post-organizers were compared. No sig. difference .10 when scores of pre- and post-organizers were averaged and compared with no-organizer.

TABLE 1 (Cont'd)

Investigator	Year	Type of Organizer	Number of Subjects	Level and Subject Area	Length of Study	Results
Bauman, Glass and Harrington	1969	Advance, post- and no-organizer	21	College: Statistics	1 class period	Post-organizer sig. .05 when advance and post-organizers were compared. No sig. difference .10 when scores of pre- and post-organizers were averaged and compared with no-organizer.
Jerrolds	1967	Advance organizer, modified advance organizer, no-organizer	84	High School: Reading (espionage)	1 class period	No sig. difference among groups on posttest or delayed posttest (4 days). Students who scored below the 49th percentile on the ITBS not included.
Neisworth	1967	Advance organizer vs. introduction	180	High School: Accidental poisoning	4 days	No sig. difference on posttest and on delayed posttest (20 days).

TABLE 1 (Cont'd)

Investigator	Year	Type of Organizer	Number of Subjects	Level and Subject Area	Length of Study	Results
Schulz	1966	Advance organizer vs. no-organizer	376	Elementary: Science	20 weeks	No statistically sig. difference on the posttest or the delayed posttest (10 weeks).
Studies Using Multi-Media Organizers						
Scandura and Wells	1967	Organizer in the form of a game vs. historical introduction	104	College: Mathematics	1 class period	Organizer in the form of a game sig. .05.
Weisberg	1970	2 types of visual advance organizers, one written expository organizer, and no-organizer	96	Elementary: Science	1 class period	Both visual organizers sig. .05. No sig. difference between written expository organizer group and control group.

TABLE 1 (Cont'd)

Investigator	Year	Type of Organizer	Number of Subjects	Level and Subject Area	Length of Study	Results
Livingston	1970	Advance organizer (simulation game) vs. no-organizer	22	Elementary: Geography	1 class period	No sig. difference.
Livingston	1970	Advance organizer (simulation game) vs. no-organizer	40	High School: Geography	1 week	No sig. difference.
Livingston	1970	Advance organizer (simulation game) vs. no-organizer	32	Elementary: Geography	1 week	No sig. difference.
Barron	1971	Graphic organizer, prose organizer, and no-organizer	?	High School: Astronomy	1 class period (30 minutes)	No sig. difference at any grade level.

found to be unfamiliar to the subjects on a pretest. Ausubel reported that the expository advance organizer was written at a much higher level of generality, abstraction, and inclusiveness than the learning passage; the historical passage was written to create interest among the subjects and did not relate directly to the concepts that were tested. The treatment was administered in one 35 minute period and the posttest was administered 3 days later. The difference between means of the experimental and control groups was, according to Ausubel, almost significant at the .01 level in favor of the group using the expository advance organizer.

Ausubel and Fitzgerald (1961), using university undergraduate students, compared the effectiveness of three types of introductory passages; a comparative organizer, an expository organizer, and an historical introduction. The comparative organizer pointed out explicitly the differences and similarities between the material to be learned, Buddhism, and material which was already familiar to the learner, Christianity. The comparative organizer was designed to increase discriminability between the two sets of concepts. The expository organizer presented the principal Buddhist doctrines at a high level of abstraction, generality, and inclusiveness without making reference to Christianity. The historical introduction, which was intended solely as a control treatment, presented historical and human interest information. It contained no comparisons between the religions. The treatment lasted 3 days and was immediately followed by a posttest. A delayed posttest was administered on the tenth day following the treatment. On the posttest the comparative organizer was found to be statistically significant ($p<.05$) when compared with the expository organizer and the historical introduction. On the delayed posttest both the expository and the comparative organizers were significant ($p<.05$, $p<.02$) when compared with the historical introduction.

Ausubel and Fitzgerald (1962), again using college undergraduates as subjects, compared the effectiveness of an expository organizer and an introductory passage in a study of the endrocrinology of pubescence. A comparison of the means of the total experimental group with the total control group produced nonsignificant results ($p<.07$). Using verbal ability scores on the SCAT as a basis for blocking, they found significant results for the lower one-third group in favor of the expository organizer ($p<.01$).

Ausubel and Youssef (1963), using 162 senior college students as subjects, compared the effect of the advance organizer and a nonideational passage of historical and biographical nature. The treatment lasted 4 days including a posttest. It was followed by a delayed posttest 10 days after completion of the treatment. They reported significance in favor of the advance organizer ($p<.01$) when verbal ability was held constant by means of analysis of covariance. When knowledge of Christianity was held constant the performance of the advance organizer group was significantly higher at the .05 level.

In the four studies by Ausubel and his collaborators the control groups used introductory passages which did not relate directly to the concepts to be learned, while the experimental groups used organizers which were directly related to the concepts to be learned. The differences between or among treatments may have resulted from the introduction of extraneous concepts which may have interfered with the learning of the concepts from the learning passage, rather than from any facilitative effects of the advance organizers.

Groteluescher and Sjogren (1968) conducted two studies, one with 24 intellectually gifted adults and the other with 48 graduate education students. They compared three experimental treatment groups and one control treatment group. The experimental treatments contained key ideas in the study of mathematics while the control treatment consisted of historical and descriptive information about units of measurement.

The authors concluded from both studies that experimental treatment materials not only facilitated the learning of new materials but also facilitated transfer, especially when the learning material was presented in a partially sequenced manner. While Ausubel and Fitzgerald (1962) found that the advance organizer facilitated learning for those students whose SCAT scores were in the lower one-third of the distribution, Groteluescher and Sjogren (1968) concluded from their study that the advance organizer facilitated learning for intellectually gifted adults and graduate students.

Allen (1969), using 212 ninth-grade students as subjects, compared the effects of an advance organizer introduction and a non-advance organizer introduction in social studies. The advance organizer, according to Allen, was written at a higher level of abstraction, generality, and inclusiveness than the non-advance organizer; however no clear definition of either was provided. The treatment lasted for 4 class periods with the posttest administered on the fifth day. A delayed posttest was administered 3 weeks following the treatment. Allen concluded that the advance organizer enhanced learning for above average students as measured on a delayed posttest but that it had no facilitative effect with less able students. These findings are in conflict with those of Ausubel and Fitzgerald (1962).

Neisworth and others (1969) compared the effectiveness of a 200 word advance organizer with a motivational introduction of similar length in science. They used 184 educable mentally retarded (EMR) adolescents and 184 intellectually normal elementary grade students. The treatment lasted for 4 class periods. A delayed posttest was administered 14 days after the treatment. They reported no significant difference between the advance organizer group and the control group with the EMR students. They did find a significant difference ($p<.05$) in favor of the advance organizer group on the posttest and on the delayed posttest for the intellectually normal children.

Steinbrink (1970) used six intact social studies classes of rural Black fifth and sixth grade students in his study. He stated that his experimental group was given a conceptual advance organizer and daily advance organizers. The control group received the conceptual organizer at the end of the unit and did not receive daily advance organizers. The study was conducted over a 5 week instructional period, which was considerably longer than most others reviewed. Steinbrink found a significant difference ($p<.05$) in favor of the advance organizer. However, the use of individual students rather than class means as the unit of statistical analysis has been questioned because of possible violation of independence (Glass & Stanley, 1970, pp. 505-508). Other limitations of the study were the lack of randomization and the fact that students in the experimental classes were much better readers than those in the control classes, as measured by the Metropolitan Reading Test.

Studies reporting no facilitative effects of advance organizers. In addition to the studies described above which resulted in conclusions supporting the facilitative effect of advance organizers, studies have been reviewed which did not find this to be the case.

Woodward (1966), using 27 college students, compared the facilitative effects of advance and post-organizers. He found no significant difference between the two treatment groups.

Bauman, Glass, and Harrington (1969) conducted three studies with college students to investigate the effects of the position of an organizer on learning. Each treatment was 1 class period in length including the posttest. They found that the post-organizer groups scored significantly higher (p<.05) than the advance organizer groups on the posttests in all three studies and concluded that placing the organizer after a lesson has a greater facilitative effect than does the advance organizer. In contrast to the results of the other studies reviewed, Bauman, Glass, and Harrington found statistically significant results in favor of a post-organizer treatment group.

Jerrolds (1967), using 84 ninth-grade students as subjects, compared the effectiveness of an advance organizer, a modified advance organizer, and a control group using no organizer. He reported that the advance organizer was formulated on the basis of Ausubel's description. The modified advance organizer was constructed around main ideas and concepts. Students who scored below the fortieth percentile in reading on the Iowa Test of Basic Skills were dropped from the sample. No significant differences were found between the effects of the advance organizer and the modified advance organizer groups nor were the results for either of the advance organizer groups found to differ significantly from those of the control group.

Neisworth (1967), using 180 educable mentally retarded adolescents, compared the advance organizer with an introductory passage. The topic under study was accidental poisoning. The treatment lasted for 4 days plus the posttest. A delayed posttest was administered 20 days later. Neisworth found no significant difference in achievement between groups.

Schulz (1966), using 376 sixth-grade students of above average ability as subjects, compared a group that received two advance organizers based on Ausubel's criteria with a group that did not receive organizers. The subject was science. The treatment period was considerably longer than all others reviewed; it lasted 20 weeks. The first advance organizer was provided at the beginning of the study and the second one 12 weeks later. The present investigator believes that the organizers in Schulz's study were spaced too far apart to be a fair test of their ability to facilitate learning. Therefore, it was not surprising to find that the results were not significant. No statistically significant difference was found on the posttest and on the delayed posttest among any subgroups in the sample. Subgroups were based on sex, ability, and background information. It should be noted that Schulz concluded that organizers do facilitate learning when pupils lack the processing skill necessary to reorganize information independently into suitably clear inclusive and stable cognitive structure even though his statistical differences were not significant.

Studies using multi-media organizers. The concept of organizer has been utilized in studies using media other than narrative materials. Scandura and Wells (1967), using as subjects 104 college students majoring in elementary education, compared the use of an advance organizer in the form of a game with an historical introduction. The function of the game (organizer) was to present the structure of a mathematical group in terms familiar to the subjects. The experiment was conducted during 1 class period. The investigators reported that the organizer was superior to the historical introduction ($p<.05$). Instructional time was not held constant between groups; the organizer group took an average of 12% less time than the group that used the historical introduction.

Weisberg (1970), using as subjects 96 eighth-grade science students, compared the use of three types of advance organizers with a control group that used no organizer. Two of the three advance organizers were visual in nature. One of these was in the form of a graph and the other was in the form of a map. The third advance organizer was in written expository form. Weisberg worked with individual students outside the classroom. He reported both visual organizers to have a significant facilitative effect ($p<.05$) on learning. The effect of the written expository advance organizer was nonsignificant when compared with the control group. A limitation of Weisberg's study is that his results are generalizable only to individual tutoring situations, not to group instruction.

Livingston (1970) conducted three studies in three different classrooms: two eighth-grade classes and one high school class. He used a simulation game designed to teach economic geography as a pre-organizer. Livingston compared the pre-organizer group with a matched control group that did not use the simulation game as a pre-organizer. The duration of his studies varied. One lasted 1 class period; the content of the lesson was in a filmstrip. In the other two studies the instruction was a 1 week treatment; the content was textbook materials. In each study the control group scored higher, but not significantly higher, than the pre-organizer groups.

Barron (1971) tested three treatment conditions: a graphic organizer, a prose organizer, and a control group. He defined the graphic organizer as a visual and verbal presentation of the key vocabulary in a new learning task in relation to subsuming and/or parallel terms that presumably were part of the cognitive structure of the learner. The prose organizer was a written expository organizer. The sample consisted of classes in grades 6 through 12. The treatment was the same for all grades. The treatment lasted 1 class period at each grade level. Analysis of the data did not show a significant difference in favor of the organizer treatments at any grade level. Barron's study was significant to the present investigator because it took into account Ausubel's requirement that organizers be at the proper level of abstraction. This was accomplished by the inclusion of a wide range of grade levels receiving the same treatment. Another important element in Barron's study was his stated recognition that the subsuming and parallel terms were presumed rather than known to be part of the cognitive structure of the learner.

The next section indicates important questions which arise from Ausubel's concept of organizer and research which has utilized this schema.

Need for the Present Study

The review of the literature reveals several unanswered questions. The first is "What is an organizer?" The vagueness with which Ausubel defined the term has contributed to confusion in evaluating the results of research. Allen (1969) and Steinbrink (1970), for example, both wrote that they constructed organizers according to Ausubel's criteria. Their organizers, however, are very dissimilar. As with most other studies reviewed, the researchers did not operationally define their organizers. As a result, the criteria for their organizers may be only inferred from samples of their treatment materials.

The present study was an attempt to fulfill the need to operationally define an organizer. This should facilitate replication and may enable future researchers to write improved organizers. It also provides the reader with a basis for accepting or rejecting the conclusions of the present study.

The second question that emerged from the review of related literature was, "Do written organizers facilitate learning at the sixth-grade level in intact class settings?" Of the 22 studies reviewed, only 6 were conducted with elementary age children. The results of these elementary studies are conflicting. Three found that organizers facilitate learning while three did not. None of the studies reviewed were conducted below the fifth grade.

The present study was an attempt to test the facilitative effects of organizers in intact classes at the sixth-grade level.

The third question raised by a review of related literature was, "Do written organizers facilitate learning in social studies with elementary grade children?" Only three studies, one conducted by Steinbrink (1970) and two conducted by Livingston (1970), were in the social studies subject area. Of the three, only Steinbrink (1970) used written organizers. The results of Steinbrink's study cannot be considered conclusive for three reasons: his subjects were not randomly assigned to treatment groups; his pre-organizer group scored significantly higher on a standardized reading achievement test than did his post-organizer group; and the use of individual students as the unit of statistical analysis is questioned because of possible lack of independence among subjects.

The present study was an attempt to extend the Steinbrink study. Like Steinbrink, this investigator used intact classes, written expository organizers, and a treatment time period of about 25 days. While Steinbrink failed to specify his criteria, he used the principle of major and subsuming concepts in writing his organizers. The organizers are therefore similar to those used in this study.

There are, nevertheless, several differences between the two studies. In the present study classes were randomly assigned to treatment groups, whereas Steinbrink's classes were not randomly assigned. In the present study reading score differences were not significant among the three groups, whereas Steinbrink found significant differences in reading between groups. In the present study class mean scores were used as the unit of statistical analysis to ensure independence, whereas Steinbrink used individual student scores. In the present study three treatment groups, pre-organizer, post-organizer, and no-organizer, were used, whereas Steinbrink used two groups; pre-organizer and post-organizer.

The fourth question raised by a review of the literature was, "Do written organizers facilitate learning over an extended period of time?" Of the 22 studies reviewed, 20 were of relatively short duration. Eleven lasted only 1 class period and 8 lasted from 2 to 5 days. Only two, Schulz (1966) and Steinbrink (1970), were longer than 1 week in duration. Questions regarding Steinbrink's study have been discussed above. Schulz's study is also inconclusive. He administered an advance organizer to one of his treatment groups at the beginning of his study and another one 12 weeks later. Then, 20 weeks after the study was initiated and had been interrupted by Christmas vacation, he administered the posttest. It is not surprising that he found no significant differences between the organizer and no-organizer groups because only two organizers were used over the 20 week period.

This raises the fifth question, "How often should organizers be used in instructional units that last several weeks?" Of the two long term studies reviewed, Steinbrink (1970) used an introductory unit organizer and daily lesson organizers for the advance organizer treatment, while Schulz (1966) used only two organizers in a 20 week period.

In the present study, which lasted 24 days, 10 organizers were used. There was 1 unit organizer, 3 chapter organizers, and 6 sub-chapter organizers. The sub-chapter organizers were introduced where there was a major conceptual break in the logical organization of the material.

Summary. The present study attempted to operationally define the organizer and investigated the effects of organizers in intact social studies classes at the third grade level over an extended period of time.

The organizers used in the present study are the investigator's interpretation of Ausubel's expository organizer. The attributes of the organizer, as defined on pages 7 and 8 of this study, were investigator constructed. No claim is made that the organizers in this study, by definition or example, conform to all of Ausubel's criteria.

CHAPTER III

METHODOLOGIES AND PROCEDURES

This chapter describes the following nine elements of the study: 1) construction of curriculum materials; 2) experimental design; 3) construction and characteristics of anthropology achievement tests; 4) pilot study; 5) experimental study; 6) pattern of logic used in the study; 7) contextual variables; 8) characteristics of the classes; and 9) statistical analysis.

Construction of Curriculum Materials

Investigator prepared student materials were used in the present study. The student text, *The Changing World Today: Case Studies of Modernization in Japan, Kenya, and India*, Publication Number 72-1, was published by the Anthropology Curriculum Project, University of Georgia. The textbook contains the basic concepts and supporting data for a 14 week unit of study. Since the duration of the current study was limited to 24 daily lessons, only the first three chapters, Culture, Cultural Change, and Industrialization and Urbanization in Japan, were used in the study. The textbook was published in three formats:

pre-organizers, post-organizers, and no-organizers. The student textbooks were identical except for the position or absence of organizers. In the pre- and post-organizer textbooks the organizers were identical. In the pre-organizer textbooks the organizers preceded the learning passage. In the post-organizer textbooks the organizers were placed after the learning passage. The materials utilized three levels of organizers: unit, chapter, and sub-chapter. The unit organizer summarized the major concepts from the entire textbook. The chapter organizers summarized the major concepts from each chapter. The sub-chapter organizers summarized sections within chapters. A copy of the pre-organizer student textbook appears in Appendix K on page 180.

In addition to the textbooks a comprehensive student study guide, Publication Number 72-2, Anthropology Curriculum Project, was developed for student use. The student study guide was also published in three formats: pre-organizer, post-organizer, and no-organizer. The study guide consisted of exercises designed to help the students learn the concepts presented in the textbook. Concepts were presented definitionally and by example to provide practice.

Organization of Curriculum Materials

The materials were organized around concepts and key ideas from the field of cultural anthropology that deal with cultural dynamics. The settings, Japan, Kenya, and India, were used as case studies of modernization in three cultures. Japan is an example of a nation that is industrializing and urbanizing, while Kenya shows the effects of nationalism in Africa. India, the third case study, provides insight into the modernization of agriculture as a result of government planning.

The text and student guide were designed to be used in a subject curriculum and were written according to the investigator's interpretation of Ausubel's criteria of progressive differentiation and integrative reconciliation.

Experimental Design

A modified version of Campbell and Stanley's (1963) Completely Randomized Posttest-Only Control Group Design as shown below was used in the study.

$$\begin{array}{ccccc} R & X_1 & O_1 & X_1 & O_2 \\ R & X_2 & O_1 & X_2 & O_2 \\ R & X_3 & O_1 & X_3 & O_2 \end{array}$$

The Rs in the first column affirm that classes were randomly assigned to three groups and that treatments were then randomly assigned to the three groups. The X_1 in the first row indicates experimental treatment group one, namely, those classes using the pre-organizer. The X_2 in the second row identifies experimental treatment group two, namely, those classes using the post-organizer. The X_3 in the third row identifies experimental treatment group three, namely, those classes using no-organizer. The O_1s in the third column denote the administration of Anthropology Achievement Test Number One after 6 days of instruction. The O_2s in the fifth column denote the administration of Anthropology Achievement Test Number Two at the completion of 24 days of instruction.

Rationale for Posttest-Only Design

Several other research designs were considered, then rejected in favor of the Posttest-Only Design. There were several reasons for this decision. One of the reasons was the belief that pretesting was inappropriate in the present study. It was inappropriate because the study meets the criterion set forth by Campbell and Stanley (1963, p. 25). They stated that while the pretest is a concept that is deeply imbedded in the thinking of research workers in education, it is actually not essential in experimental designs. They indicated that it is inappropriate when experimenting with methods dealing with the initial introduction of new subject matter. Greene (1965), Thomas (1967), and Walsh (1967), in their studies dealing with the teaching of anthropology in the elementary grades, found that the pretest scores of pupils did not differ significantly from chance. These findings suggest that the subjects in these studies were unfamiliar with the concepts of anthropology. The chance scores on these pretests should not have been unexpected because anthropology has not traditionally been taught in the elementary grades. On the basis of the results of these studies it seemed safe to assume that pupil scores on an anthropology pretest in the present study would not differ significantly from chance.

In addition to the probability that pretest scores would not differ from chance, possible effects of the pretest on treatment were considered. Campbell and Stanley (1963, p. 25) consider the Posttest-Only Design to be preferred to the Pretest-Posttest Design in that it controls for the effects of the pretests. This point was especially significant in the present study which attempted to examine the effects of organizers on the learning of written material. It seemed highly likely that pretesting would be a confounding variable in the study.

Unit of Statistical Analysis

The investigator had two alternatives in selecting the unit of statistical analysis, either the individual student scores or class mean scores. One of the bases for a valid statistical analysis is that of independent response. Class means were used as the unit of statistical analysis in the present study because there was some concern over whether or not individual scores would meet the condition of independence (Glass and Stanley, 1970, pp. 505-508). Independence of response of individuals was questioned because the research was conducted in intact classes where there was interaction among pupils and between teachers and pupils.

Construction and Characteristics of Anthropology Achievement Tests

This section describes the procedures for developing, revising, and analyzing the tests used in the study. Three investigator-constructed, norm referenced, thirty item, three-option multiple choice instruments were constructed--a Pilot Anthropology Achievement Test which was administered to the four pilot classes, and Anthropology Achievement Tests One and Two which were administered to the twenty experimental classes.

The Pilot Test was constructed and administered concurrently with Test Number One. The main function of Anthropology Achievement Test Number One was to examine the facilitative effect of organizers at the end of 6 instructional periods. This testing was initially undertaken as a precautionary measure. The investigator was concerned that the experimental schools might not continue to participate in the study because of racial unrest in the community and school system. It was considered possible that the schools might close during the study to avoid racial problems or that teachers and administrators might not be willing to give their time and attention to the experiment if they had more pressing racial problems to face. The investigator considered these events to be possibilities because immediately prior to the start of the study high schools and junior high schools in the Savannah-Chatham School System had experienced racial unrest and the system had closed for a day.

The analysis of Test One indicated that the test was reliable (Appendix F, p. 161) as well as valid. The investigator therefore decided to report the results of Test One as additional evidence of the effects of organizers. Test One added a second dimension to the study. The data from Test One and Test Two made it possible for the investigator to examine both the short term effects of organizers (6 instructional periods) and the effects of organizers over a longer period of time (24 instructional periods).

No items from Anthropology Achievement Test Number One were included in Anthropology Achievement Test Number Two.

The procedures followed in test construction are outlined below and are discussed more fully later in this section.

1. The major concepts for the textbook were established by Dr. Marion J. Rice, Director of the Anthropology Curriculum Project, and Dr. Wilfrid C. Bailey, Professor of Anthropology (Rice, 1969).

2. Advance organizers were written by the investigator for the first three chapters of the textbook. The advance organizers defined and illustrated 40 key concepts identified in step one above.

3. The investigator constructed 277 practice exercises which were based on the 40 key concepts. Two hundred of these practice exercises were published in the student study guide that was used by the three treatment groups. An additional 77 exercises, based on the organizers, were published in the student study guide used by the pre- and post-organizer groups.

4. Twenty-seven of the 40 key concepts that were presented in Chapters 1, 2, and 3 of the student text were selected to be tested.

5. A pool of 129 questions was developed to test the students' understanding of the 27 selected key concepts. Six questions were written for each of the 16 selected key concepts from Chapters 1 and 2, and three questions were written for the 11 selected

key concepts from Chapter 3.

6. Two parallel tests were constructed for Chapters 1 and 2. One test, Pilot Anthropology Achievement Test, was developed and administered to the four pilot classes. Anthropology Achievement Test Number One was administered to the 20 experimental classes. The two tests were analyzed by the Test Scorer and Statistical Analysis (TSSA) computer program (Wolf and Klopfer, 1963).

7. Anthropology Achievement Test Number Two served as a final test and surveyed selected concepts in Chapters 1, 2, and 3. Test data from the Pilot Test were used in the construction of Anthropology Achievement Test Number Two. The test was analyzed by the TSSA computer program after it was administered.

Learning Objectives and Content

Prior to the writing of the unit, the major concepts of the grade three cultural change unit had been identified by Dr. Rice and Dr. Bailey in *Cultural Change*, Publication 36, Anthropology Curriculum Project, March 1969. These concepts served as the basis for the unit and chapter organizers which were developed by the investigator for the student textbook (Clawson, 1972a). The major concepts served the dual purpose of guiding the development of content and assuring that test items would subsequently sample the major learning outcomes desired by the writer.

Learning Objectives and Organizers

Ten organizers were written for the portion of the text used in the present study. One was written for the unit, one for each of the three separate chapters, and six for the sub-chapters in Chapter 3. The organizers served an important function in both the writing of text material and in the selection of test items. The first characteristic of the organizers used in this study was the definition and illustration of the key concepts which were explained in detail in the student textbook. The organizers thus served as a control over learning objectives, content of the textbook, and subsequent test items. The contents of the organizers and the learning passages were carefully monitored by Dr. Rice to ensure conceptual and factual consistency with the originally established learning objectives.

Advance Organizers and Test Specification

Upon completion of the writing of the unit, 40 key concepts were listed in Chapters 1, 2, and 3 of the student study guide. The investigator constructed an extensive set of workbook exercises to assist the student in developing an understanding of the concepts and to provide practice in using the concepts (Clawson, 1972b).

The student study guide required two types of responses from the students. They were constructed responses and discrimination responses. The number and type of items are listed in Table 2.

TABLE 2

Number and Type of Practice Exercises in the Student Study Guide

Content	Type of Item	
	Constructed Response Items	Discrimination Response Items
Chapter I	24	26
Chapter II	18	18
Chapter III	72	42
Total	114	86

Constructed responses required each student to write his own responses. Discrimination responses required the student to select the appropriate responses from lists of alternatives. In addition to the 200 practice items listed in Table 2 the students in the pre- and post-organizer groups had an additional 77 constructed response items that were included in practice exercises that were based on the organizers.

The Pilot Test and Test Number One sampled the learning outcomes from Chapters 1 and 2. Empirical experience from previous testing by the Anthropology Curriculum Project indicated that thirty item, three-foil tests are appropriate for use in the primary grades because they can be administered in one class period. Therefore, the investigator and Project Director decided to construct tests of not more than 30 items each.

Eighteen key concepts were identified in Chapters 1 and 2 in the textbook and student study guide. Sixteen of the key concepts were tested in the Pilot Test (Appendix E, pp. 157-158). The same 16 key concepts were also tested in Anthropology Achievement Test Number One (Appendix I, pp. 170-171). The concepts of "extended family" and "nuclear family" were dropped because they were not considered to be critical to an understanding of cultural change. A copy of the Pilot Anthropology Achievement Test appears in Appendix B, pp. 139-142. A copy of Anthropology Achievement Test Number One appears in Appendix B, pp. 143-146.

Twenty-two key concepts were identified in Chapter 3 of the textbook and student study guide. Anthropology

Achievement Test Number Two sampled 22 concepts from Chapters 1, 2, and 3. In Anthropology Test Number Two 11 concepts were carried forward from Chapters 1 and 2 and an additional 11 concepts were included from Chapter 3. A copy of Anthropology Achievement Test Number Two appears in Appendix B, pp. 147-150. The concepts tested in Anthropology Achievement Test Number Two are listed in Appendix I, pp. 172-173. The two tests, Anthropology Achievement Tests Number One and Two, sampled 27 of the 40 key concepts in the first three chapters--16 in Test One and 11 in Test Two.

In selecting the concepts for inclusion in Anthropology Achievement Test Number Two, the criteria of generalizability and inclusiveness, as applied to the concept of cultural change, were used. For example, modernization, technology, diffusion, industrialization, and urbanization were included in the test while such concepts as agriculture, trade, raw material, and life expectancy were not.

Relation of Student Study Guide Items to Test Items

As noted in Table 2, students had an opportunity to use a minimum of 200 items to practice the 40 key concepts in Chapters 1, 2, and 3. Practice was facilitated by three types of items: constructed response items, in which individual students had to match the concept with a definition or an example; discrimination response items, in which individual students had to discriminate between a correct definition or an example; and open-ended questions or activities, in which students were encouraged to use or think about the material studied in new settings.

All items in the tests, Pilot Test, Test One, and Test Two, were of the multiple choice, discrimination response type. The distribution of the types of items in each test is summarized in Table 3.

TABLE 3

Distribution of Types of Items in Each Test

Type of Item	Test		
	Pilot	One	Two
Definitional	15	15	12
Example	2	2	10
Application	13	13	8

Establishing Content Validity of the Tests

The following procedure was followed to establish content validity.

The 27 selected key concepts from the first three chapters of the student textbook were listed by the investigator. A minimum of six multiple choice questions were written for each of the selected 16 concepts from Chapters 1 and 2. A minimum of three multiple choice items were written for the 11 selected concepts from Chapter 3. Three types of questions were written for each concept. One type of question presented definitions of a concept and required the student to select the correct concept from three options. The second type of question presented examples from the text and required the student to select the correct concept from three options. The third type of question required the student to apply the concept to an unfamiliar context, one that was not in the text. This was done by presenting an unfamiliar example and requiring the student to select the correct concept from three options. The procedure described above produced a pool of 129 questions.

Pilot Test and Anthropology Achievement Test Number One. From the pool of test questions, the 96 questions that sampled the concepts from the first two chapters were examined and 30 questions were selected for each test. The Pilot Test and Test One were constructed in parallel form; corresponding items in each test sampled the same concept. The first consideration was content validity. Care was taken to include questions for each of the selected 16 key concepts. Second, there was an attempt to weight the tests in favor of definitional type questions.

The decision to weight the test in favor of definitional type questions was a joint decision made by Project staff members. In each of the two tests (Pilot Test and Test One) 50% of the questions were definitional while the remaining 50% were divided between example and application (Table 3). The third step was to review the questions and to check the questions against Ebel's (1965, pp. 151-170) suggestions for writing multiple choice test items. Some questions were rewritten and others were judged to be less desirable because they failed to meet specified criteria. The fourth step was to construct the two thirty item tests and a table of specifications. The fifth step was to arrange for a competent, independent review and revision of the items. This too was in accordance with Ebel's suggestions (Ebel, 1965, p. 169).

The proposed tests were submitted to Dr. Rice who made editorial changes, reviewed the items and compared them with the test specifications and the selected key concepts from Chapters 1 and 2 in the textbook to assure content validity. The content validity of each test was then independently verified by Dr. James R. Richburg, faculty member in the Department of Social Science Education at the University of Georgia. Dr. Rice monitored the process at each level of development; Dr. Richburg examined the tests after they had reached the final stage of development.

Test revision and construction of Anthropology Achievement Test Number Two. Test data from the pilot study were used to improve the reliability of Anthropology Achievement Test Number Two. Students in the pilot study were administered the Pilot Anthropology Achievement Test at the completion of Chapter 2. Data from this test were analyzed and 15 questions were selected to be used in Anthropology Achievement Test Number Two. Four factors influenced the selection of questions: content validity, item difficulty, type of question (definition, example, and application), and point biserial correlation of items with the total test score. The data from the Pilot Test were used in the following manner:

1. Content validity was the foremost concern. Key concepts from the first two chapters of the text were once again reviewed. Dr. Rice and the investigator selected the 11 concepts that were included in the final examination. The selection of concepts was based on the criteria of generalizability and inclusiveness, as applied to the concept of cultural change. There is a subjective element of choice in the selection of content valid items which grew out of the investigator's experience of working with the material. In general, however, length of

treatment in the text was a guide to the emphasis given a concept.

2. The items pertaining to each selected concept were identified, and item difficulty was examined (Appendix E, pp. 157-158). Among the items that tested the same concept, those that came closest to .50 in difficulty were considered superior to items that were either very difficult or very easy. Three items, numbers 1, 8, and 13, were relatively easy; over 79% of the pilot students responded correctly to each of them. Although they were easy, these items were not dropped, but were included in Anthropology Achievement Test Number Two because they sampled selected key concepts.

3. The type of question was also a factor in selecting items to be included in the test. An attempt was made to maintain a balance between definition, example, and application questions (Table 3).

4. Point biserial correlation of items with the total test score was also considered in item selection. However, it was not considered to be as important a criterion as the others discussed above. Items with high point biserial correlations were judged superior to items with low correlations.

5. After the 15 items were selected, student

responses to each individual question were examined. In five cases the stems were reworded, and in two cases foils were changed in the hope that the items would function better. The items that were changed are identified in Appendix E, pp. 157-158.

The above procedures describe how 15 items from the Pilot Test were selected to be used in Anthropology Achievement Test Number Two. The remaining 15 items were selected to sample selected concepts from Chapter 3. The procedures followed in writing and selecting items and verifying content validity were identical to those used in constructing the Pilot Anthropology Achievement Test and Anthropology Achievement Test Number One which have been previously described.

Test Statistics: Reliability and Standard Error of Measurement of the Means

Test reliability and item analysis data were compiled as part of the TSSA computer program. Test reliability and the standard error of the measurement of the means for the three tests are presented in Appendix F, pp. 160-164. Test statistics are reported by individual classes and with the classes combined.

The reliability coefficients, Kuder-Richardson Formula 20, indicate the consistency with which an individual is ranked within his group. A limitation of the reliability coefficient is that its size depends partially on the variability of the group being tested (Ebel, 1965, p. 333).

The standard error of the measurement of the mean provides an indication of the precision of measurement of the mean. It is an estimate of the standard deviation of the distribution of measurements of a mean if the same group was to be tested many times under conditions of no testing effect. The standard error of the measurement of the mean is affected very little by the variability of the group being tested (Ebel, 1965, p. 333).

Test statistics for the Pilot Anthropology Achievement Test are in Appendix F on page 160.

Not all of the test data from Anthropology Achievement Test One were analyzed by the TSSA computer program. Limited financial resources made it necessary to estimate the reliability of the test from a random sample. An estimate of the reliability of the test was obtained in the following manner:

1. One class was randomly selected from each of the three treatment groups.
2. Test data from the three classes were then analyzed by the TSSA computer program.

Test statistics for the three randomly selected classes appear in Appendix F, p. 161.

Test statistics of the 20 experimental classes for Anthropology Achievement Test Two appear in Appendix F, pp. 162-164.

Pilot Study

The purpose of the pilot study was to establish the reliability of the final examination (Anthropology Achievement Test Number Two). In the original plan the pilot study was to have been conducted several weeks prior to the experimental study so that the reliability of the final examination could be improved. Because of delays in the printing of the curriculum materials, it was not possible to conduct the pilot study prior to the experimental study so the two were conducted concurrently. This caused a major change from the original plan since there was not enough time to revise the final examination after it was administered to the pilot study and before it had to be administered to the experimental study. Therefore, test reliability and item analysis data from the Pilot Test, which was administered after 6 days of instruction, were collected and were used to improve the reliability of the final examination.

Procedures and Results

An available pool of four third grade classes was assigned to three treatment groups. Selected personal and educational characteristics of the pilot study teachers were obtained by means of a questionnaire. The word meaning section of the Stanford Reading Test was administered to all pilot classes to provide the investigator with standardized information about the pilot students.

Selection and assignment of pilot classes. Although three teachers in Clarke County, Georgia were asked to participate with their classes in the pilot study, four teachers volunteered and all four classes were accepted. Two of the pilot classes used materials with pre-organizers, one with post-organizers, and one with no-organizers. All classes in the pilot study were randomly assigned to groups. Because of the limited number of post-organizer and no-organizer copies of the student texts that were available, it was necessary to arbitrarily assign the group with two classes to the pre-organizer treatment group.

Selected characteristics of pilot teachers and students. The degree to which the pilot and experimental classes were similar influenced the appropriateness of applying pilot study item analysis and reliability data to the experimental classes. Therefore, data were collected regarding selected personal and educational characteristics of teachers as well as reading ability of students in both the pilot and experimental studies.

A Teacher Information Sheet which focused on selected personal and educational characteristics was completed by each teacher in the pilot group (Appendix A, p. 124). A summary and comparison of the characteristics of the pilot and experimental teachers is reported in Appendix C, p. 153.

The average ages of the teachers in both groups were similar. The major differences between the two groups had to do with years of teaching experience and professional training. Teachers in the pilot study had almost 10 years less experience than the teachers in the experimental study. Teachers in the pilot study had more professional training than did teachers in the experimental study.

Prior to the start of the pilot study the word meaning section of the Stanford Achievement Test, Primary II, Form W was administered to the students. Only students present on the day of testing were administered the word meaning test. A summary and comparison of pilot and experimental student scores on the reading word meaning test appear in Appendix D, p. 155.

Students in the pilot study averaged 4.53 raw score points higher on the word meaning test than did students in the experimental study. This represents a difference of 6 months when converted to grade equivalent scores.

Since the primary purpose of the pilot study was to provide data for improving the reliability of the final test for the experimental study (Anthropology Achievement Test Number Two), the differences in selected teacher and student characteristics were not considered to be great enough to prevent the pilot group from serving this function.

Experimental Study

The purpose of the experimental study was to investigate the facilitative effects of pre- and post-organizers on the learning of anthropology concepts at the third grade level.

Sample Selection

Dr. Marion J. Rice, Director of the Anthropology Curriculum Project, made arrangements with officials of the Savannah-Chatham County Public Schools in Georgia to obtain 20 intact classes in three schools for the experimental study.

Random Assignment of Classes to Treatment Groups

There were two steps in the randomization procedure. First, classes were randomly assigned to three groups. Second, treatments were randomly assigned to groups.

Orientation of Teachers

Orientation meetings were held in the three schools for the teachers and principals who participated in the study. Each teacher was provided with written instructions regarding procedures to be followed during the study (Appendix A, pp. 121-133). In addition each teacher was given textbooks and student study guides which were published in the format to be used by her class. No attempt was made to train the participating teachers in the teaching of anthropology because such training does not result in increased pupil achievement (Greene, 1966).

Duration of the Study

The study was conducted over a 24 day instructional period, from April 4 to May 4, 1972.

Pattern of Logic Used in the Study

A randomized one-factor group design, k=3 treatment group, was used in the present study.

Treatments

1	2	3
$\bar{X}_{11}$	$\bar{X}_{12}$	$\bar{X}_{13}$
$\bar{X}_{21}$	$\bar{X}_{22}$	$\bar{X}_{23}$
$\bar{X}_{31}$	$\bar{X}_{32}$	$\bar{X}_{33}$
$\bar{X}_{41}$	$\bar{X}_{42}$	$\bar{X}_{43}$
$\bar{X}_{51}$	$\bar{X}_{52}$	$\bar{X}_{53}$
$\bar{X}_{61}$	$\bar{X}_{62}$	$\bar{X}_{63}$
	$\bar{X}_{72}$	$\bar{X}_{73}$
$\bar{X}_{.1}$	$\bar{X}_{.2}$	$\bar{X}_{.3}$

Treatment groups are identified as follows:

Treatment Group	Type of Treatment
1	Pre-organizer
2	Post-organizer
3	No-organizer

Research Hypotheses

The following research hypotheses were investigated:

1. Classes using structured anthropology materials

with pre-organizers will score significantly higher ($p<.15$) on the anthropology achievement tests than will classes using materials with post-organizers.

2. Classes using structured anthropology materials with pre-organizers will score significantly higher ($p<.15$) on the anthropology achievement tests than will classes using materials with no-organizers.

3. Classes using structured anthropology materials with post-organizers will score significantly higher ($p<.15$) on the anthropology achievement tests than will classes using materials with no-organizers.

Pattern of Logic for Testing the Research Hypotheses

The pattern of logic for testing the three hypotheses is illustrated on the following page.

Statement	Logical Pattern	Source
If the hypothesis is true then $\bar{X}_{.1}$ (mean of the group using a pre-organizer) will be significantly higher than $\bar{X}_{.2}$ (mean of the group using a post-organizer) as measured on a posttest	If A, then B	Assumption
For $\bar{X}_{.1}$ to be significantly higher than $\bar{X}_{.2}$ without the hypothesis being true is extremely unlikely (p .15)	B without A is extremely unlikely	Assumption
If $\bar{X}_{.1}$ is higher than $\bar{X}_{.2}$	B is true	Experimental evidence
Therefore: The hypothesis is more credible	A is much more credible	Polya Pattern IV

Discussion of the Pattern of Logic

The pattern of logic used as a base for the study claims that it is extremely unlikely for $\bar{X}_{.1}$ to be significantly higher than $\bar{X}_{.2}$ without the hypothesis being true ($p<.15$). This claim can be considered to be probable only if the personal attributes of the subjects and contextual attributes other than treatment are eliminated as probable causes for the difference.

In the present study personal attributes of the subjects can be eliminated as a probable cause of the observed differences among group means within the limits of the probability of a Type I error (.15). This is true because of the randomization factor in the research design. The personal attributes of the subjects were randomly distributed along with the assignment of classes to treatment groups. While randomization does not ensure that the two groups are perfectly matched on all variables which might influence the results of the experiment, it does guard against the danger of systematic biases in the data (Myers, 1966, p. 7).

The research design does not take into account contextual or situational variables that might cause a difference between group means. The investigator dealt with these variables in two ways. Whenever possible, direct control of the variable was exercised. Where this was impractical, the variable was described systematically.

Direct control was exercised over the treatment materials, directions to teachers, total duration of the treatment, and administration of tests.

Due to the limitation of experimenting with existing classes which functioned within the framework of the school and the school system, there were some contextual variables that could not be controlled by the investigator. They are described in the following section.

Contextual Variables

Contextual variables which could not be controlled included the effects of the community, school district, school, and the teachers.

Community and School District

The study was conducted in the Savannah-Chatham County Public Schools. The population of Chatham County has remained stable for the past ten years at approximately 188,000. The economic structure of the city and county, although diversified, is dominated mainly by the seaport and the military, with manufacturing next in importance.

The student enrollment in the Savannah-Chatham County Public Schools was 40,761 for the 1970-71 school year. The school system operates 18 secondary and 45 elementary schools. The Savannah-Chatham County Schools have not received voter support for school millage increases since 1960. Consequently, the school district spent an average of $472.33 per pupil during the 1969-70 school year; this was approximately $172 less than the median expenditure per child nationally for districts with more than 25,000 students (Whitlock, 1971).

The school system is under court order to maintain racial balance of faculties and students in every school.

Although limited integration was initiated in 1963 under a freedom of choice plan, district-wide integration began during the 1971-72 school year. Each school with a predominately black student body was paired with a school with a predominately white student body, and massive busing was used to achieve racial balancing between paired schools.

In Savannah-Chatham County, as in many other urban school systems throughout the country, integration by means of busing was resisted by many citizens. Beginning in 1970 white citizens' groups actively campaigned against busing. Protest marches were held, petitions were signed, and schools were boycotted. About 1500 white students withdrew from the public schools in the fall of 1970 and began attending private schools, many of which were recently opened. The most recent school boycott was held in February of 1972, less than 2 months prior to the beginning of the present study.

The week of March 10 to March 16, 1972 was a time of racial unrest in the junior high and high schools. During this week several schools in the district were forced to close for a day or portion of a day. Racial incidents led to the closing of all schools in the system for 1 day on March 17, 1972.

Characteristics of the Schools in the Study

The 20 classes that participated in this study were located in three schools in the Savannah-Chatham County School District. Appendix G, p. 166, shows the random assignment of teachers by treatment and school.

School A. The original construction of the school was completed in 1955 with an addition in 1963. There were 29 regular classroom teachers, 3 teachers of the educable mentally retarded, 1 librarian, 2 corrective reading teachers, and 1 art teacher at the school. The school was administered by the building principal.

Classes were self-contained, heterogeneous, and averaged 29 students per class.

The racial composition of the school was 34% white and 66% black. Seventy-three percent of the students were from families with annual incomes of less than $3,000. The principal reported that racial tension was not a problem in the school.

School B. The original construction of the school was completed in 1956 with an addition in 1963. There were 23 teachers, 1 librarian, and 1 specific learning disabilities teacher at the school. The school was administered by the building principal.

The classes were self-contained, heterogeneous, and averaged 30 students per class.

The racial composition of the school was 52% white and 48% black. Twenty-seven percent of the students were from families with annual incomes of less than $3,000. The principal reported that racial tension was not a problem in the school.

School C. The original construction of the school was completed in 1963 with an addition in 1964. There were 33 teachers, 1 librarian, and 1 specific learning disabilities teacher at the school. The school was administered by the principal and an acting principal.

The school provided special reading instruction for approximately 100 third and fourth graders. Approximately 45 of the students from this school who participated in the study received special reading instruction.

The classes were self-contained and basically heterogeneous. Racial composition of the school was approximately 60% white and 40% black. Twenty-seven percent of the students were from families with annual incomes of less than $3,000. The principal reported that racial problems have been minor.

Characteristics of the Teachers in the Study

The 20 teachers who participated in the study appear to be representative of the teachers in the Savannah-Chatham County Public Schools. Teachers in the no-organizer group were generally older and had more teaching experience than the teachers in the pre-organizer and post-organizer groups. The random assignment of classes placed the only 2 male teachers in the study in the post-organizer treatment group. There appears to be little difference among the groups related to educational training in anthropology. Teacher characteristics are summarized in Table 3.

Summary of Contextual Variables

The three schools that participated in the study were similar in organizational patterns and student populations. All three schools were racially integrated for the first time during the current school year. All classes in the study were integrated. Classes were self-contained and were taught by the classroom teachers. The observed differences among the treatment groups regarding the personal attributes of the teachers were deemed to be minor. The investigator concluded that there were no contextual variables, other than treatment, that accounted for observed differences among treatment groups on the anthropology achievement tests.

Characteristics of Classes

There was a total of 565 students in the 20 classes in the study. One of the personal attributes of the

TABLE 4

Selected Characteristics of Teachers in the Study and in Savannah - Chatham County Public Elementary Schools

Teacher Characteristic	Teachers in the Study				Chatham County Elementary 1970-71
	Pre-organizer	Post-organizer	No-organizer	All Teachers in the Study	
Age	M_{dn} 36.5 $\bar{X}$ 36.3	M_{dn} 36 $\bar{X}$ 35.6	M_{dn} 44 $\bar{X}$ 45.6	M_{dn} 38 $\bar{X}$ 39.3	M_{dn} 38.8
Sex	6 Female	5 Female 2 Male	7 Female	18 Female-90% 2 Male-10%	94.2% Female 5.8% Male
Teaching Experience	M_{dn} 13.5 $\bar{X}$ 12.2	M_{dn} 10 $\bar{X}$ 7.8	M_{dn} 16 $\bar{X}$ 18	M_{dn} 13.5 $\bar{X}$ 12.7	M_{dn} 11.7
Professional Training	BA 6	BA 6 MA 1	BA 7	BA 19 MA 1	BA 99+ % MA 15
Professional Training in Anthropology	0	1 teacher with 10 quarter hrs.	0	19-No training, 1-10 hrs.	No data available
College Major	6 Elem. Ed.	6 Elem. Ed. 1 Biology	5 Elem. Ed. 1 Home Ec. 1 English	17 Elem. Ed. 1 Biology 1 Home Ec. 1 English	No data available

M_{dn} = Median

$\bar{X}$ = Mean Score

students which was not controlled was socioeconomic status. The investigator planned to describe this variable by means of the Hollingshead (1957) two-factor index of social position: level of education and occupation of head-of-household. When school personnel were approached about collecting the data for computing the Hollingshead index of social position, they asked that the investigator not send a questionnaire home requesting the information because of the possible negative reaction of the parents. As an alternative, students' cumulative records were examined, but the required information was not available. Therefore, the percentage of families within each participating school who earned less than $3,000 annually is reported. Seventy-three percent of the families of the students who attended School A had annual incomes of under $3,000. Schools B and C each reported that 27% of their students' families fell in this category.

Class sizes and reading test mean raw scores and standard deviations are presented in Appendix H, p. 168. The average class size for all treatment groups combined was 28 students. The breakdown of average class size by treatments is as follows: pre-organizer 30, post-organizer 27, and no-organizer 28.

Reading Word Knowledge

There is evidence to indicate that reading achievement is highly correlated with anthropology achievement when Georgia Anthropology Curriculum Project materials are used (Thomas, 1967; Gaines, 1971). Therefore, reading achievement was selected as the covariate in the present study.

The word meaning section of the Stanford Achievement Test (Kelly *et al.*, 1964) was administered to the subjects. During the preliminary stages of the study the Project Director's request to administer a total standardized reading test to the students in the study was discouraged by school personnel. They were reluctant to grant permission because of recent parental concern over the use of standardized testing results. However, school personnel did agree to allow the word meaning section of the test to be administered. Since it is generally accepted that word meaning knowledge is highly correlated with the total reading ability, the word meaning section of the test was considered to be sufficient. A summary of reading word knowledge data appears in Appendix J, p. 176.

Statistical Procedures

A one-way fixed-effects analysis of covariance was conducted using the mean scores of the three groups on Anthropology Achievement Tests One and Two to determine if the adjusted means differed significantly ($p<.15$) across treatment groups. Reading word meaning knowledge was used as the covariate. The application of the analysis of covariance partialed out differences in word meaning knowledge among the treatment groups and reduced the experimental error caused by initial differences in reading achievement. The computer program used in data analysis was the Modified University of Georgia Analysis of Least-Squares (MUGALS).

Assumptions Underlying the Analysis of Covariance

For the analysis of covariance to be an appropriate test of the hypothesis the data must meet the assumptions required for using the analysis of variance. These assumptions are:

1. the deviation of the individual mean scores from the treatment group population mean are independently distributed,
2. the deviation of the individual mean scores from the treatment group population mean are normally distributed,
3. the variance is homogeneous for all treatment groups,
4. the null hypothesis is true (Myers, 1966, p. 61).

If the first three assumptions are valid, then a significant F may be attributed to the falsity of the fourth assumption (Myers, 1966, p. 61).

To meet the assumptions underlying the F test, the following procedures were used:

1. Independence was met by the random assignment of classes to groups and then random assignment of treatment to groups.
2. Normality was of no concern since the F ratio is little influenced by departures from normality (Myers, 1966).
3. Homogeneity of variance was tested by using Hartley's test, and the data met this requirement for both tests.

In addition to meeting the assumptions for the analysis of variance there are additional requirements for using the analysis of covariance. They are:

1. The values of the covariate cannot be influenced by the treatment.
2. The regression of treatment on reading is linear for all treatment populations.
3. The regression line has the same slope in all treatment populations.

To meet these additional assumptions the following procedures were used:

1. Reading achievement tests were administered prior to treatment; thus they were not influenced by the

treatment.

2. The assumptions for two and three above were tested by the investigator. The data met the conditions of homogeneity of regression for both tests.

Statement of the Statistical Hypothesis

The purpose of the present study was to determine the effects of organizers on the learning of structured anthropology materials in the third grade. In order to accomplish this objective the following statistical hypothesis was tested at the .15 significance level.

H_o: adj. μ_1 = adj. μ_2 = adj. μ_3.

The statistical hypothesis states that there were no statistical differences among the adjusted means of the three treatment groups. The statistical hypothesis was tested against the two-tailed alternative hypothesis that:

H_1: adj. $\mu_1 \neq$ adj. $\mu_2 \neq$ adj. μ_3.

The nondirectional hypothesis states that there were statistical differences among the adjusted means. The nondirectional alternative hypothesis was selected because there was no presupposed reason to expect one treatment to be more facilitative of learning than the others.

Post hoc comparisons were planned between treatment groups if the analysis of covariance had indicated significance. *Post hoc* comparisons were planned using the

Scheffé test. An a priori decision was made to make the following comparisons if a significant F had been obtained.

	Treatment Group		
Comparison	Pre-organizer	Post-organizer	No-organizer
1	+1	-1	0
2	+1	0	-1
3	0	+1	-1

Comparison 1

H_o: adj. μ_1 - adj. μ_2 $= 0$
H_1: adj. μ_1 - adj. μ_2 $\neq 0$

The statistical hypothesis (H_o) in comparison number one states that in the population pre-organizers and post-organizers produce the same average performance on the anthropology achievement tests. The nondirectional alternative hypothesis (H_1) was justified because there was no presupposed reason to expect one alternative to be more facilitative of learning than the other.

Comparison 2

H_o: adj. μ_1 - adj. μ_3 $= 0$
H_1: adj. μ_1 - adj. μ_3 $\neq 0$

The statistical hypothesis (H_o) in comparison number two states that in the population pre-organizers and no-organizers produce the same average performance on the anthropology achievement tests. The nondirectional alternative hypothesis (H_1) again seemed justified.

Comparison 3

H_o: adj. μ_2 - adj. μ_3 $=$ 0

H_1: adj. μ_2 - adj. μ_3 $\neq$ 0

The statistical hypothesis (H_o) in comparison number three states that in the population post-organizers and no-organizers produce the same average performance on the anthropology achievement tests. The nondirectional alternative hypothesis (H_1) again seemed justified.

Significance Level

The null hypothesis was tested at the .15 level of significance. This means that a difference as large as or larger than the designated one could occur by chance 15 times out of 100. Therefore, the maximum probability of rejecting a true statistical hypothesis (Type I error) is .15. The failure to reject a false statistical hypothesis (Type II error) must also be considered. The selection of a significance level reflects a compromise between the relative importance of Type I and Type II errors (Myers, 1966, p. 29). The significance level in effect sets the probability of making a Type I error. However, there is an inverse relationship between Type I and Type II errors. Increasing the significance level lowers the probability of making a Type I error but increases the probability of making a Type II error. By selecting a significance level of .15 instead of one that is higher the probability of making a Type II error is reduced. Davis (1964, p. 359) stated that the .15 level is often considered strong enough to warrant concluding that the difference is not attributable merely to errors of measurement.

Walker and Lev (1958) stated that when small sample sizes are used the level of significance should not be high because both factors reduce the power of the test. In the present study the sample size was 20 intact classes. Therefore, a .15 level of significance was considered to be appropriate. A final reason for selecting the .15 level was that this study lends itself to replication, thus reducing the necessity for a higher level of significance.

Limitations

The present study was limited to an investigation of the effects of organizers on learning. It was further limited to the effects of written organizers that met the criteria specified by the investigator in Chapter 1. Empirical verification of the operational characteristics of the investigator-constructed criteria was not independently replicated.

A second limitation of the study resulted from the application of organizers to structured anthropology materials written according to the investigator's interpretation of Ausubel's definitions of progressive differentiation and integrative reconciliation.

A third limitation of the study was the use of an available pool of 565 third-grade students in 20 classes in the Savannah-Chatham County School System. This population could not be considered as representative of a national sample. The subjects were below the national average in reading word knowledge as measured by the Stanford Achievement Test. In addition the ethnic composition of the sample did not follow national ratios. In the present study approximately 50% of the students were black. This is considerably larger than the national percentage of 11.2 and the nation-wide percentage for metropolitan areas of 12.2 (U. S. Bureau of Statistics, 1971, pp. 27, 16).

A fourth limitation of the study was the relatively small sample size which resulted from the use of class means rather than individual pupil scores as the unit of analysis. Obtaining statistically significant results is unlikely when small sample sizes are used.

A fifth limitation of the study was that systematic observations were not made in the participating classes during the treatment period to ensure that written and oral directions were being followed. Oral directions were provided prior to the start of the treatment, and each teacher was given written directions and a detailed time schedule to follow. In addition each teacher and her students were given textbooks and student study guides which were published in the format to be followed. The investigator made weekly visits to and telephone contacts with all participating schools. These procedures strengthen the assumption that the teachers followed the instructions outlined, but the degree to which individual teachers may have deviated from established procedures cannot be determined.

A sixth limitation of the study was the gap between the average reading level of the students, 2.9 as measured on the word meaning section of the Stanford Achievement Test, and the reading level of the materials. It is estimated that the material would be more appropriate for students reading at grade level and above.

CHAPTER IV

RESULTS AND DISCUSSION

The present study was unable to produce evidence supporting the hypothesis that either pre- or post-organizers facilitate learning of structured anthropology materials at the third grade level.

An analysis of covariance was used to test the statistical hypothesis. Anthropology posttest achievement was the criterion variable. Reading word meaning knowledge, as measured by the Stanford Achievement Test, was the covariate.

The statistical hypothesis that there are no statistically significant differences ($p<.15$) among the treatment groups using pre-organizers, post-organizers, and no-organizers was tested at two time intervals. Anthropology Achievement Test Number One was administered after 6 days of instruction and surveyed the concepts taught in Chapters 1 and 2 of the student textbook, The Changing World Today: Case Studies of Modernization In Japan, Kenya, and India. Anthropology Achievement Test Number Two was administered after 24 days of instruction and surveyed the concepts taught in the first three chapters of the textbook.

Presentation of the Findings

The findings for the study are reported separately for each test.

Anthropology Achievement Test Number One

The statistical hypothesis, H_o: adj. μ_1 = adj. μ_2 = adj. μ_3, that there were no statistically significant differences ($p<.15$) among the adjusted means across treatment groups was tested against the alternative hypothesis, H_1: adj. $\mu_1 \neq$ adj. $\mu_2 \neq$ adj. μ_3, that there were statistically significant differences among the adjusted means. The computed F ratio to test the null hypothesis was nonsignificant and the observed differences among adjusted means were interpreted as a function of chance. Table 5 summarizes the analysis of covariance for the test.

Since the results of the F test were nonsignificant there was no need to make the planned *ad hoc* comparisons.

Table 6 shows the raw means and the adjusted means for the three treatment groups. The analysis of covariance adjusted the raw treatment means downward for the pre-organizer treatment group, whereas the raw treatment means for the post-organizer and no-organizer groups were adjusted upward.

TABLE 5

Comparison of Adjusted Mean Scores on
Anthropology Achievement Test Number One
Using Word Meaning Knowledge as the Covariate

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Squares	F
Total	19	99.38		
Model	3	54.49	18.16	6.49*
Treatment	2	7.66	3.83	1.37
Reading Achievement	1	54.48	54.48	19.42*
Error	16	44.89	2.80	

*$p < .15$.

TABLE 6

Raw Mean Scores and Adjusted Mean Scores for
Treatment Groups on
Anthropology Achievement Test Number One

Treatment	Raw Mean Scores	Adjusted Mean Scores
Pre-organizer	15.30	14.35
Post-organizer	15.33	15.51
No-organizer	15.33	15.97

Anthropology Achievement Test Number Two

The statistical hypothesis, H_o: adj. μ_1 = adj. μ_2 = adj. μ_3, that there were no statistically significant differences ($p < .15$) among the adjusted means across treatment groups was tested against the alternative hypothesis, H_1: adj. $\mu_1 \neq$ adj. $\mu_2 \neq$ adj. μ_3, that there were statistically significant differences among the adjusted means. The computed F ratio to test the null hypothesis was nonsignificant and the observed differences among adjusted means were interpreted as a function of chance. Table 7 summarizes the analysis of covariance for the test.

Since the results of the F test were nonsignificant there was no need to make the planned _ad_ _hoc_ comparisons.

Table 8 shows the raw means and the adjusted means for the three treatment groups. The analysis of covariance adjusted the raw treatment means downward for the pre-organizer group and upward for the post-organizer and no-organizer groups.

TABLE 7

Comparison of Adjusted Mean Scores on
Anthropology Achievement Test Number Two
Using Word Meaning Knowledge as the Covariate

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Squares	F
Total	19	189.51		
Model	3	122.25	40.71	9.69*
Treatment	2	11.22	5.61	1.34
Reading Achievement	1	110.39	110.39	26.28*
Error	16	67.26	4.20	

*p < .15.

TABLE 8

Raw Mean Scores and Adjusted Mean Scores for
Treatment Groups on
Anthropology Achievement Test Number Two

Treatment	Raw Mean Scores	Adjusted Mean Scores
Pre-organizer	18.09	16.73
Post-organizer	16.19	16.43
No-organizer	17,25	18.16

Discussion of the Findings

The reasons for obtaining nonsignificant results in the study are subject to speculation. Some possibilities that occur to the present investigator are presented.

The most likely reason is that organizers do not facilitate learning when the organizers, concepts to be learned, organization of curriculum materials, and subjects are similar to those in the present study. However, there are other plausible reasons for nonsignificance. Among these are the influence of the unit of statistical analysis used, the influence of normal teaching procedures which may have functioned as organizers, and the influence of the highly structured materials used in the study.

The use of class mean scores, rather than individual student scores, reduced the sample size. Since only 20 classes were included in the study, the F table had to be entered at only 2 and 16 degrees of freedom thereby requiring large differences in group mean scores in order to obtain statistical significance. According to the view of Glass and Stanley (1970, pp. 505-508), a legitimate analysis in classrooms where there is interaction among people requires that class means be used as the unit of analysis rather than individual student scores. They further pointed out that such use of class means increases the probability of obtaining statistically nonsignificant results because of the small number of replications.

Another possible reason for the nonsignificant results is that the normal teaching procedures of introducing, motivating, reviewing, and summarizing may have functioned as organizers. Teachers in the no-organizer group were not provided with written organizers; however, direct investigator observations in the participating classes were impractical so the extent to which normal teaching procedures may have served as organizers cannot be determined.

Further, it is possible that nonsignificant results were obtained because the text materials were organized according to Ausubel's definition of progressive differentiation (higher to lower inclusiveness). Ausubel cautioned that if materials are organized in this way the potential benefits derived from advance organizers will not be actualized. Though the potential benefit may not be actualized, he stated that:

> regardless of how well organized learning material is, however, it is hypothesized that learning and retention can still be facilitated by the use of advance organizers at an appropriate level of inclusiveness [Ausubel, 1963, p. 82].

The results of the present study do not support Ausubel's hypothesis according to the definition of advance organizer used in the present study. However, these results can only be generalized to groups using similar organizers, with materials written in a similar fashion, and when administered to subjects with characteristics similar to those in the treatment population.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of the present study was to compare the facilitative effects of pre- and post-organizers on the learning of structured anthropology materials at the third grade level. The investigation was an outgrowth of interest in David P. Ausubel's theory of meaningful, verbal reception learning. Ausubel hypothesized that organizers facilitate learning when presented to students in advance of materials to be learned.

Hypothesis

There are no statistical differences among the adjusted means of groups using materials with pre-organizers, post-organizers, and no-organizers.

Procedures

A student textbook, The Changing World Today: Case Studies of Modernization in Japan, Kenya, and India, was written as part of the curriculum development and research work of the Anthropology Curriculum Project at the

University of Georgia. The textbook was written in three formats. Two of the formats used organizers for the unit and for each chapter and sub-chapter. In one format the organizer preceded the learning passage (pre-organizer), while in the other format the organizer followed the learning passage (post-organizer). The third format presented only the learning passage (no-organizer). The learning passages in all three textbooks were identical.

In addition to the textbook, each student received a comprehensive study guide. The study guide was published in three formats: pre-organizer, post-organizer, and no-organizer.

Twenty third grade classes from the Savannah-Chatham County Public Schools in Georgia served as the experimental population. From this available pool the classes were randomly assigned to three groups and then treatments were randomly assigned to groups.

Because individual classes were the smallest units of independence, classroom mean scores were used as the unit of statistical analysis. A one-way fixed-effects analysis of covariance, with reading word meaning knowledge as the covariate, was used to determine if the adjusted mean scores differed significantly across treatment groups on the anthropology achievement tests. The null hypothesis was tested at two time intervals: at the end of 6 instructional lessons, and at the end of 24 instructional lessons. An a priori decision was made to make three post hoc comparisons if the F ratio indicated that there were significant differences ($p<.15$) among the adjusted means of the three treatment groups.

Findings

The findings of the investigation were reported separately for each of the two time intervals: after 6 and 24 instructional lessons.

The null hypothesis of no statistical difference among adjusted means of the three treatment groups on the anthropology achievement tests was accepted in each of the two F tests. Since the null hypothesis was accepted, no post hoc comparisons were made.

Conclusions

The findings for the main treatment effects were consistent. The study was unable to produce evidence supporting the hypothesis that either pre- or post-organizers facilitate learning of structured anthropology materials at the third grade level. There were no statistical differences among the treatment groups as measured by the anthropology achievement tests. The lack of statistical difference does not necessarily rule out practical difference. A visual inspection of treatment means, however, did not reveal a direction of difference that indicates practical difference in favor of any one of the three treatments.

Recommendations

Based on the findings, observations, and conclusions of the present study, the investigator submits the following specific recommendations for further research relating to the facilitative effects of organizers.

The first two recommendations are to investigate Ausubel's contention that the organizer material should be at the appropriate level of abstraction. By using students with higher abilities and differing ages, a researcher could explore the concepts of abstraction and cognitive structure of the learner across ability and age groups with controlled materials.

1. This study should be replicated in its present design with third graders with higher academic abilities.
2. This study should be replicated in its present design with students in the fourth and fifth grades.

The organizers, as operationally defined in the present study, more nearly meet Ausubel's criteria of presenting the student with a brief summary of the more detailed material at a higher level of abstraction, generality, and inclusiveness. However, Ausubel's distinction between organizers and overviews was not a part of the present study. To investigate the effects of organizers and overviews the following recommendation is made:

3. A study should be designed to compare the effects of organizers written at varying levels of abstraction, generality, and inclusiveness. Ausubel (1963) attempted to distinguish between general overviews and organizers. If these can be operationally defined so as to be distinguishable, a comparative study would contribute to an understanding of the effects of different types of introductory passages.

It is quite possible that organizers facilitate learning for some students but not for others. This possibility was not investigated in the present study.

4. Studies should be designed with students blocked by verbal ability, reading level, age, sex, and other criteria that may make a difference in learning potential or style to determine if students with particular attributes may benefit from using curriculum materials with pre- or post-organizers.

It may be that learning is facilitated when students write their own post-organizers. This increased involvement of the learners may be the key to conceptualization and retention of the concepts.

5. Studies should be designed in which students write their own post-organizers to investigate the facilitative effects on learning.

The current literature reveals an interest in the use of games, graphs, maps, and other media as organizers. The results of these studies are inconclusive. Some researchers (Scandura & Wells, 1967; Weisberg, 1970) found that multi-media organizers facilitated learning while others (Livingston, 1970; Barron, 1971) reported no such facilitative effects.

6. Studies should be designed to compare the facilitative effects of different types of organizers: multi-media as well as expository.

All of the studies reviewed contained symbols (e.g., written passages, maps, graphs, games, and filmstrips as organizers). Perhaps the use of artifacts, rather than symbols, facilitate learning.

7. Studies should be designed using artifacts as organizers to investigate their effects on facilitating learning.

The investigator further suggests that an exploratory study be made tracing the historical roots of the general organizer concept to determine if a thesis type study would be justified. Herbart and Morrison had earlier hypothesized that information prior to instruction facilitates learning.

8. A study tracing the theoretical and historical development of this general subject might prove to be a worthwhile contribution to knowledge.

In the present study the organizer did not facilitate learning as measured by the anthropology achievement tests. However, the ability of the organizer to assist curriculum writers to produce materials that are based on progressive differentiation and integrative reconciliation has not been tested. In the present study the investigator used organizers to assist him in the sequencing of concepts from general to specific and to write the material in such a way as to encourage the learner to integrate and reconcile new concepts with those which were taught previously.

9. It is recommended that an investigation of the ability of organizers to serve as guides to the curriculum writer be conducted.

In addition to the need for further research regarding organizers, other elements of Ausubel's theory of meaningful, verbal reception learning should be investigated. Several of these elements fall within the concepts of practice and instructional materials. Task variables which pertain to practice include amount, distribution, type, and method of practice as well as the influence of task homogeneity, learning set, knowledge of results, task size, and the internal logic and organization of instructional materials.

Amount of practice was not precisely controlled in the present study; however, total duration of the study was specified by the investigator and was adhered to by all participating teachers. Treatment groups using no-organizers spent the same number of days in the study as groups using organizers. This provided more time for the no-organizer group to review and discuss the learning passages. Had the duration of the study not been held constant, the no-organizer group might have completed the study in a shorter period of time thus decreasing the amount of practice for that group. In contrast, the organizer groups might have taken the same amount of time or even more time thus benefiting from additional practice.

10. Studies should be designed to investigate
the effects of varying amounts of practice.

A second task variable that needs investigation is that of distribution of practice. The question of distribution of practice typically refers to whether practice is intense or distributed and involves elements of forgetting which result from passage of time or interference of subsequently learned material.

In the present study measurement of learning and retention occurred at two different intervals for all treatment groups. The first test was administered after 6 days of instruction and the second after 23 days. There was no difference, therefore, in the distribution of practice for any treatment group. Theoretically, the organizer groups had opportunities for more intensive practice, but because the logical organization of the content to be learned for all groups was the same and the time of opportunity for learning was the same, the question of distribution of practice was not examined in the context of the study.

11. Studies should be designed to investigate the influence of intense and distributed practice.

Types and methods of practice were not controlled in the present study but were partially specified by the materials and tests used. The types of practice provided were reading the student text, discussing the concepts in class, completing the student workbook, and taking the tests. The organizer groups had additional practice in that they read the organizers as well as the learning passages in their texts. In addition, several teachers reported using audio-visual media, art activities, trade books, resource speakers, and field trips as part of their anthropology teaching units. It is not known what practice effect these experiences had on the learners. The method of practice was built into the anthropology achievement tests and student study guides. It involved a combination of constructed responses and selected responses. In the constructed response items, the students were required to respond to incomplete stems. Definitional, example, and application exercises were used. In addition, selected responses were utilized, of the three-foil, multiple choice type. These responses were also of the definitional, example, and application types. In addition, there were open-ended questions and involvement exercises. It is not known the extent to which all of these methods were used, but it appears that primary emphasis was given to the constructed and selected responses.

From a theoretical standpoint, the no-organizer group was presented a method of whole learning whereas the organizer groups were presented methods which combined whole and part learning, part learning being represented by the organizer and whole learning being represented by the full text material.

12. Studies should be conducted to investigate the effects of various types and methods of practice.

Task homogeneity is another variable associated with meaningful learning. It refers to the number of contexts in which examples of concepts are presented. No attempt was made in the present study to try to develop heterogeneous as compared with homogeneous tasks. The principle of progressive differentiation and integrative reconciliation, which served as guidelines for development of the materials, required that new concepts and factual information be related to the previously introduced general and more abstract concepts. Therefore, an effort was made to give different examples of the same concept consistent with some concern for total length of the material.

13. Studies should be designed to investigate the effects of using homogeneous and heterogeneous tasks on concept development.

Another task variable associated with meaningful learning is learning set. Ausubel (1963, pp. 202-203) defines two elements of the learning set: warm-up and learning-to-learn. These components refer to the readiness and willingness of students to learn subject matter in a meaningful fashion rather than merely in a rote manner. One of the possible advantages of the pre-organizer, in contrast with material which has a post-organizer or no-organizer, is that the pre-organizer may function as a warm-up component which serves to create a predisposition to learn verbal material meaningfully.

In the short term studies reviewed by the present investigator, the advantage of the pre-organizer may be attributed to its function as a warm-up. According to

Ausubel, warm-ups have a short term effect and account at most for part of the improvement in learning that occurs during a single day. The present study lasted over a full month so it is reasonable to assume that any warm-up effect of the pre-organizer was dissipated over the long time period.

Long term improvement in learning must be accounted for solely in terms of learning-to-learn effects (Ausubel, 1963, p. 203). In the present study the pre-organizer apparently did not function as a learning-to-learn agent.

14. Studies should be designed to investigate the effects of using organizers which are specifically written to provide the student with methodological sophistication in approaching a given learning task (learning-to-learn).

The investigator does not recommend further research into the effects of organizers to serve as warm-ups because any short term advantage seems to disappear over time (Ausubel, 1963, p. 202).

Another very important variable in learning is knowledge of results. While feedback is frequently interpreted as reinforcement, it may equally well be interpreted as a way in which to help the student construct the desired cognitive structure. In the present study the student study guide provided answer sheets which students could use to check their constructed and selected responses. Students and teachers were not presented knowledge of results on the anthropology achievement tests until after the study was completed. Even then, only raw scores, class mean scores, and treatment mean scores were presented to them. Therefore, neither students nor teachers received knowledge of results on specific items or concepts.

15. Studies should be designed to investigate the effects of knowledge of results.

Another variable in learning is the size of the task to be learned. Subject matter learning tasks constitute a part of a continuum, and it is very difficult to isolate appropriate tasks. In verbal learning, components are usually logically sequential, rather than constituting a hierarchy of difficulty.

In the present study learning tasks were constructed around concept clusters, which consist of a major concept and sub-concepts. Some clusters are complex, as measured by the number of subsumers necessary to elucidate the concept, while others are less complex.

16. Studies should be designed to investigate the effects of task size.

One of the most important variables has to do with difficulty of the instructional material. If it is too difficult, achievement results are small in comparison to effort; if it is too easy, results are meager in terms of time spent. The difficulty of the material is clearly related to and influences learning time, the learning curve, and the amount of material learned and retained. Since task difficulty is related to the individual learner, the present investigator was unable to write instructional materials which anticipated learner variables related to task difficulty.

The materials used in the present study were quite difficult, probably too difficult for the subjects, whose reading word meaning knowledge was approximately 8 months below the national average.

17. Studies should be designed to investigate the appropriateness of the materials, in terms of difficulty, with students at higher grade levels.

The two major programmatic factors of the theory of meaningful, verbal reception learning concern internal logic and organization of the instructional materials. Progressive differentiation and integrative reconciliation are these two factors. Although the materials used in the present study were developed according to the investigator's interpretation of these two factors, the effects of progressive differentiation and integrative reconciliation were not investigated.

18. Studies should be designed to investigate the effects of using materials written according to progressive differentiation and integrative reconciliation with materials written according to other formats.

Summary of Recommendations and Conclusions

Ausubel's theory of meaningful, verbal reception learning is worthy of continued research. One of the important elements of the theory, the advance organizer, has received the major attention of researchers.

Other task variables need to be systematically analyzed and investigated. Some of these variables include the amount, distribution, type, and method of practice. Other variables include task homogeneity, learning set, knowledge of results, and task size. Two major programmatic factors of the theory concern the internal logic and organization of instructional materials: progressive differentiation and integrative reconciliation.

The series of recommendations listed above is beyond the capabilities of a single investigator working alone. Therefore, it is recommended that a comprehensive study of the theory of meaningful, verbal reception learning be conducted. The present investigator envisions this study as a large scale team effort in which each team member investigates a single task variable yet coordinates his research with that of his colleagues. In this way the theory of meaningful, verbal reception learning, as a whole, can be evaluated. It is felt that this team approach would make a contribution to knowledge far greater than could be gained from the present practice of independent researchers investigating the effects of a single element of the theory.

REFERENCES

Allen, D. I. Some effects of advance organizers and level of retention of written social studies material. Unpublished doctoral dissertation, University of California, 1969.

Ausubel, D. P. The use of advance organizers in the learning and retention of meaningful verbal material. *Journal of Educational Psychology*, 1960, *51*, 267-272.

Ausubel, D. P. *The psychology of meaningful verbal learning*. New York: Grune & Stratton, 1963.

Ausubel, D. P. A cognitive theory of school learning. Paper presented at the meeting of the American Psychological Association, San Francisco, September, 1968. (a)

Ausubel, D. P. *Educational psychology*: *A cognitive view*. New York: Holt, Rinehart & Winston, 1968. (b)

Ausubel, D. P., & Fitzgerald, D. The role of discriminability in meaningful parallel learning. *Journal of Educational Psychology*, 1961, *52*, 266-274.

Ausubel, D. P., & Fitzgerald, D. Organizer, general background, and antecedent learning variables in sequential verbal learning. Journal of Educational Psychology, 1962, 53, 243-249.

Ausubel, D. P., & Youssef, M. The role of discriminability in meaningful parallel learning. Journal of Educational Psychology, 1963, 54, 331-336.

Barron, R. R. The effects of advance organizers upon the reception learning and retention of general science content. Final report: Department of Health, Education and Welfare, Project Number: 1B-030; Grant Number: OEG-2-710030, Date: November, 1971.

Bauman, D. J., Glass, G. V., & Harrington, S. A. The effects of the position of an organizer on learning meaningful verbal materials. Research Paper, No. 24, Laboratory of Educational Research, University of Colorado, 1969.

Bloom, B. J. (Ed.) Taxonomy of educational objectives, handbook I: Cognitive domain. New York: David McKay, 1956.

Brancht, G. H., & Glass, G. V. The external validity of experiments. American Educational Research Journal, 1968, 5, 437-474.

Bruner, J. S. The process of education. New York: Vintage Books, 1960.

Campbell, D. T., & Stanley, J. C. *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally (Reprint from Handbook of research on teaching, Gage, N. L.), 1963.

Clawson, E. U., & Rice, M. J. *The changing world today: Case studies of modernization in Japan, Kenya, and India*. Athens, Georgia: Anthropology Curriculum Project, University of Georgia, 1972. (a)

Clawson, E. U., & Rice, M. J. *The changing world today: Case studies of modernization in Japan, Kenya, and India, Student Study Guide*. Athens, Georgia: Anthropology Curriculum Project, University of Georgia, 1972. (b)

Compayré, G. *Herbart and education by instruction*. Translated by Maeia E. Findlay. New York: Thomas Y. Crowell, 1907.

Davis, F. B. *Educational measurements and their interpretation*. Belmont, California: Wadsworth Publishing Company, 1964.

Dayton, C. M. *Design of educational experiments*. New York: McGraw-Hill, 1970.

Dunkel, H. B. *Herbart and Herbartarianism: An educational ghost story*. Chicago: University of Chicago Press, 1970.

Ebel, R. L. *Measuring educational achievement*. New Jersey: Prentice-Hall, 1965.

Edwards, A. L. *Experimental design in psychological research*. New York: Holt, Rinehart & Winston, 1950.

Gage, N. L. (Ed.) *Handbook of research on teaching*. Chicago: Rand McNally, 1963.

Gaines, W. G. An application of John B. Carroll's model of school learning to the teaching of anthropology. Unpublished doctoral dissertation, University of Georgia, 1971.

Glass, G. V., & Stanley, J. C. *Statistical methods in education and psychology*. New Jersey: Prentice-Hall, 1970.

Greene, W. W., Jr. Anthropological teaching in the first and fourth grades: A comparison of trained and non-trained teachers as measured by pupil test performance. Unpublished doctoral dissertation, University of Georgia, 1966.

Groteluescher, A., & Sjogren, D. D. Effects of differentially structured introductory materials and learning tasks on learning transfer. *American Educational Research Journal*, 1968, *2*, 191-202.

Jerrolds, B. W. The effects of advance organizers in reading for the retention of specific facts. Unpublished doctoral dissertation, University of Wisconsin, 1967.

Kelly, T. L., Madden, R., Gardner, E. F., & Rudman, H. C. Stanford achievement test (Primary II Battery, Form W). New York: Harcourt, Brace & World, Inc., 1964.

Livingston, S. A. Simulation games as advance organizers in the learning of social science materials: Experiments 1-3. *Report No. 64*, John Hopkins University, April, 1970.

Morrison, H. C. *The practice of teaching in the secondary schools*. Chicago: University of Chicago Press, 1926.

Myers, J. L. *Fundamentals of experimental design*. Boston: Allyn & Bacon, 1966.

Neisworth, J. T. The use of advance organizers with the educable mentally retarded. Unpublished doctoral dissertation, University of Pittsburgh, 1967.

Neisworth, J. T., & others. Influences of an advance organizer on the verbal learning and retention of educable mentally retardates, a comparison of educable mentally retardates and intellectually normal performance. Final report: Department of Health, Education and Welfare, Project Number: 6-2122; Grant Number: OEG 1-6-06112-1570, Date: August 31, 1968.

Polya, G. *Patterns of plausible inference mathematics and plausible reasoning*. Vol. 2. Princeton, New Jersey: Princeton University Press, 1954.

Rice, M. J., & Bailey, W. C. *Cultural change*. Athens, Georgia: Anthropology Curriculum Project, University of Georgia, 1969.

Rice, M. J., & Bailey, W. C. The development of a sequential curriculum in anthropology, grades 1-7. Final report: Department of Health, Education and Welfare, Project Number: H-128; Contract Number: OE-4-10-204, Date: May 1, 1971.

Scandura, J. M., & Wells, J. N. Advance organizers in learning abstract mathematics. *American Educational Research Journal*. 1967, *4*, 295-301.

Schulz, R. W. The role of cognitive organizers in the facilitation of concept learning in elementary school science. Unpublished doctoral dissertation, Purdue University, 1966.

Smith, B. O., Stanley, W. O., & Shores, V. H. *Fundamentals of curriculum development*. (Rev. ed.) New York: Harcourt, Brace, & World, 1957.

Steinbrink, J. E. The effects of advance organizers for teaching geography to disadvantaged rural black elementary students. Unpublished doctoral dissertation, University of Georgia, 1970.

Stendler, C. B. Insight into effective science teaching: The developmental approach of Piaget and its implication for science in the elementary schools. The MacMillan Science Series, New York: MacMillan, 1966.

Thomas, G. The use of programmed instruction for teaching anthropology in the fifth grade. Unpublished doctoral dissertation, University of Georgia, 1967.

Thorndike, R. L., & Hagen, E. *Measurement and evaluation in psychology and education*. New York: John Wiley & Sons, 1955.

Tuddenham, R. D. Jean Piaget and the world of the child. *American Psychologist*, 1966, *21*, 207-217.

U. S. Bureau of Statistics. Statistical abstract of the United States: 1971 (92 ed.) U. S. Government Printing Office, Washington, D. C., 1971.

Walker, H. M., & Lev, J. *Elementary statistical methods*. (Rev. Ed.) New York: Holt, Rinehart & Winston, 1958.

Wash, J. A. An evaluation of pupil performance in the Anthropology Curriculum Project, grades 1, 2, 4, and 5. In Teaching Anthropology in the Elementary School, AERA Panel 1967, General Information Series No. 5, Anthropology Curriculum Project, University of Georgia, 1967.

Weisberg, J. S. The use of visual advance organizers for learning earth science concepts. Paper presented at the annual meeting of the National Association for Research in Science Teaching. (43rd) Minneapolis, March, 1970.

Whitlock, J. W. (Director) *Savannah-Chatham County Public Schools*. A Survey Report, Division of Surveys and Field Services. Nashville: George Peabody College for Teachers, 1971.

Wolf, R., & Klopfer, L. *Test scorer and statistical analysis*. Chicago: University of Chicago Computer Program Library, 1963.

Woodward, E. L. A comparative study of teaching strategies involving advance organizers and post organizers and discovery and nondiscovery techniques where the instruction is mediated by computer. Unpublished doctoral dissertation, Florida State University, 1966.

APPENDIX A

Instructions to the Teacher

THE CHANGING WORLD TODAY

Field Testing

Instructions to the Teacher

Enclosure 1:	Teacher Background Materials
Enclosure 2:	Teacher Information Sheet
Enclosure 3:	Suggested Time Schedule
Enclosure 4:	Teacher Check List
Enclosure 5:	Teaching the Unit

Anthropology Curriculum Project
University of Georgia
Athens, Georgia
April 1972

INSTRUCTIONS TO THE TEACHER

I. Before Teaching the Unit

1. Read the sections of the Teacher Background Material - Cultural Change that have been listed as appropriate for the unit you will be teaching. (See attached sheet, Enclosure 1.)
2. Read the Student Textbook - The Changing World Today.
3. Administer the reading test to all students on April 4. Administer the make-up reading test to children absent on the day of the test. Make-ups should be completed between April 4 and April 7. No child need be administered the reading test after the 7th. If the child was absent for the test and re-test, place his name on the test and mark absent across the face of the test. Reading test forms and directions for administering will be picked up at your school on April 14.
4. Complete the attached form requesting information about the teacher. The form will be picked up at your school on April 14. (See attached sheet, Enclosure 2.)

II. Teaching the Unit

The textbook, The Changing World Today consists of five chapters. The field testing of the materials will be completed in two parts.

Part I will be approximately five weeks (April 4-May 4) and will cover the materials in Chapters I, II, and III.

Part II will consist of the material in Chapters IV and V.

Part I

Due to the nature of the data gathering we are imposing some constraints on instructional time for Part I. We are asking that the time be held approximately the same for all classes participating in the study. To meet this requirement we are asking that the teachers follow the Suggested Time Schedule. A starting date is prescribed as is the ending date. (See Suggested Time Schedule, Enclosure 3.)

Part I of the study consists of nine instructional sections.

Chapters I and II are relatively short; each is to be treated as an instructional section. Chapter III is longer; it has been divided into seven separate sections.

Anthropology Achievement Test. An anthropology achievement test will be administered at the completion of Chapters II and III. The test at the end of Chapter II surveys the materials in Chapters I and II. It will be administered on April 12. The test at the end of Chapter III will survey the major concepts taught in the first three chapters. The test will be administered on May 4.

Part II

Part II of the field testing covers the material in Chapters IV and V. There are fifteen instructional sections in Chapters IV and V.

The time requirement for Part II is not as strict as for Part I. It is suggested that teachers teach each section in the same manner as you taught Part I.

Anthropology Achievement Test. You will be provided a review test for Chapters IV and V. These tests are for your own use. You may pick and choose from the suggested test items. A final unit test will also be provided. The final test surveys the material in all five chapters in the textbook.

Anthropology Curriculum Project
April 1972
Enclosure 1

THE CHANGING WORLD TODAY

Teacher Background Material

The Anthropology Curriculum Project provides teacher background materials for each unit of study. The teacher background material, *Cultural Change*, was written to accompany both *The Changing World Today* and *Cultural Change in Mexico and the United States*.

It is suggested that teachers read the following pages in the teacher background materials, *Cultural Change*:

The Changing World Today:

			Pages
Part I:	Culture and Cultural Change		1-51
Part II:	Cultural Change: Case Studies		
	Africa:	cultural breakdown and rise of nationalism	63-78
	Japan:	industrialization and urbanization	79-93
	India:	planned change for an underdeveloped nation	126-134
	United States:	a case study of cultural change	135-146

Anthropology Curriculum Project
Cultural Change
April 1972
Enclosure 2

TEACHER INFORMATION SHEET

Only descriptive information of the teachers, as a group, will be used in the research report. Information about individual teachers will not be reported.

Treatment Group (please circle one):

Pre-organizer Post-organizer No organizer

Age:

Sex:

Number of Years of Teaching Experience:

Degrees:

Number of Units taken in Anthropology:

College Major:

Pre-organizer

The Changing World Today
April 1972
Enclosure 3

SUGGESTED TIME SCHEDULE

Date	Instructional Materials	Pages
April 4	Unit Organizer Chapter I Organizer	UO-1 and UO-2 1-CO-1
April 5-6	Chapter I	1-2
April 7, 10-11	Chapter II Organizer Chapter II	2-CO-1
April 12	Chapters I and II Test	
April 13-14	Chapter III Organizer Culture and Cultural Change During Japan's Early History	3-CO-1 9-12
April 17-18	Organizer Japan Begins to Modernize	3-0-2 13-15
April 19-20	Organizer Industrialization	3-0-3 17-21
April 21, 24	Organizer Growing Population and Growing Industries	3-0-4 23-27
April 25-26	Organizer Urbanization	3-0-5 29-32
April 27-28, and May 1	Organizer Results of Modernization	3-0-6 33-40
May 2-3	Organizer Selective Diffusion	3-0-7
May 4	Anthropology Achievement Test: Chapters I, II, and III	

Post-organizer

The Changing World Today
April 1972
Enclosure 3

SUGGESTED TIME SCHEDULE

Date	Instructional Materials	Pages
April 4-6	Chapter I Chapter I Organizer	1-2 1-CO-1
April 7, 10-11	Chapter II Chapter II Organizer	3-7 2-CO-1
April 12	Chapters I and II Test	
April 13-14	Chapter III--Culture and Cultural Change During Japan's Early History	9-12
April 17-18	Japan Begins to Modernize Organizer	13-15 3-0-2
April 19-20	Industrialization Organizer	17-21 3-0-3
April 21, 24	Growing Population and Growing Industries Organizer	23-27 3-0-4
April 25-26	Urbanization Organizer	29-32 3-0-5
April 27, 28, and May 1	Results of Modernization Organizer	33-40 3-0-6
May 2-3	Selective Diffusion Organizer Chapter III Organizer Unit Organizer (in back of book)	43 3-0-7 3-CO-1 UO-2 and UO-1
May 4	Anthropology Achievement Test: Chapters I, II, and III	

No organizer

The Changing World Today
April 1972
Enclosure 3

SUGGESTED TIME SCHEDULE

Date	Instructional Materials	Pages
April 4-6	Chapter I	1-2
April 7, 10-11	Chapter II	3-7
April 12	Chapters I and II Test	
April 13-14	Chapter III--Culture and Cultural Change During Japan's Early History	9-12
April 17-18	Japan Begins to Modernize	13-15
April 19-20	Industrialization	17-21
April 21-24	Growing Population and Growing Industries	23-27
April 25-26	Urbanization	29-32
April 27-28, and May 1	Results of Modernization	33-40
May 2-3	Selective Diffusion Review	43
May 4	Anthropology Achievement Test: Chapters I, II, and III	

The Changing World Today
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Enclosure 4

CHECK LIST FOR TEACHERS

_______	April 4	Administer reading vocabulary test to all students. Administer make-up test during April 5-7.
_______	April 4	Complete Teacher Information Form.
_______	April 4	Begin teaching The Changing World Today. (See suggested time schedule for pacing lessons.)
_______	April 12	Administer Anthropology Achievement Test No. 1.
_______	April 14	Reading tests, teacher information sheet, and Anthropology Achievement Test No. 1 will be picked up at your school.
_______	May 4	Administer Anthropology Achievement Test No. 2.
_______	May 5	Anthropology Achievement Test No. 2 will be picked up at your school. Begin Chapter IV--Nationalism and Modernization in Kenya.
_______		At the completion of Chapter V administer Anthropology Achievement Test No. 3.

For additional information or assistance call collect:

Elmer U. Clawson
107 Dudley Hall
University of Georgia
Athens, Georgia 30601
Telephone: 404/542-5518

Pre-organizer

Anthropology Curriculum Project
The Changing World Today
April 1972
Enclosure 5

Teaching the Unit - Instructions to the Teacher

General procedures to be followed for each section.

1. Teach the section organizer first. Teach it the way you would normally teach any new material.
2. Teach the section that follows the organizer the way that you would normally teach any new materials. Key words are in bold face. The key words can be introduced in the same manner that new words would be introduced in a reading lesson.

Specific instructions.

Step 1. Before starting each instructional section read and discuss the organizer for that section. Complete the section in the Student Study Guide relating to the organizer. The exercises for organizers are found in the back section of the study guide. All exercises for organizers are grouped together in this one section.

Step 2. The key words for each section of the textbook are written in the Student Study Guide. The words can be introduced in the same manner in which the teacher would introduce new words in a reading list. The first task is to decode. Students can demonstrate this skill by recognizing and saying the word.

Step 3. Have the students complete Section II of each exercise in the study guide. This exercise asks the student to match the key word with its definition. Section III asks the student to define the key words in his own words.

Step 4. After the student has completed steps 1, 2, and 3, proceed through each instructional section in the textbook. The key words appear in bold face type in the textbook.

Step 5. After each instructional section has been completed, ask the students to complete Sections IV, V, and VI for the section.

Step 6. At the end of each chapter in the study guide there are a series of thought questions. The thought questions ask the students to apply the knowledge they have gained.

Step 7. At the end of each chapter there is a review test. The questions are a review of the major concepts taught in the unit. The teacher should review the test with the students. In this way the review test becomes an important part of the learning process.

Post-organizer

Anthropology Curriculum Project
The Changing World Today
April 1972
Enclosure 5

Teaching the Unit - Instructions to the Teacher

General procedures to be followed for each section.

1. Teach each section first. Teach it the way you would teach any new materials. Key words are in bold face. The key words can be introduced in the same manner that new words would be introduced in a reading lesson.

2. Teach the section organizer after you have taught the content from the text. The organizer is to serve as a review. Teach it the same way you would normally teach any new material.

Specific instructions.

Step 1. The key words for each section of the textbook are written in the Student Study Guide. The words can be introduced in the same manner in which the teacher would introduce new words in a reading list. The first task is to decode. Students can demonstrate this skill by recognizing and saying the word.

Step 2. Have the students complete Section II of each exercise in the study guide. This exercise asks the student to match the key word with its definition. Section III asks the student to define the key words in his own words.

Step 3. After the students have completed steps 1 and 2 proceed through each instructional section in the textbook. The key words appear in bold face type in the textbook.

Step 4. As a review of the key concepts in the instructional section read and discuss the organizer for the section. Complete the section in the Student Study Guide relating to the organizer. The exercises for the organizers are grouped together in this one section.

Step 5. At the end of each chapter in the study guide there are a series of thought questions. The thought questions ask the students to apply the knowledge they have gained.

Step 6. At the end of each chapter there is a review test. The questions are a review of the major concepts taught in the unit. The teacher should review the test with the students. In this way the review test becomes an important part of the learning process.

No organizer

Anthropology Curriculum Project
The Changing World Today
April 1972
Enclosure 5

Teaching the Unit - Instructions to the Teacher

General procedure to be followed for each section.

> Teach each section the way you would teach any new materials. Key words are in bold face. The key words can be introduced in the same manner that new words would be introduced in a reading lesson.

Specific instructions.

Step 1. The key words for each section of the textbook are written in the Student Study Guide. The words can be introduced in the same manner in which the teacher would introduce new words in a reading list. The first task is to decode. Students can demonstrate this skill by recognizing and saying the word.

Step 2. Have the students complete Section II of each exercise in the study guide. This exercise asks the student to match the key word with its definition. Section III asks the student to define the key words in his own words.

Step 3. After each instructional section has been completed, ask the students to complete Sections IV, V, and VI for the section.

Step 4. At the end of each chapter in the study guide there are a series of thought questions. The thought questions ask the students to apply the knowledge they have gained.

Step 5. At the end of each chapter there is a review test. The questions are a review of the major concepts taught in the unit. The teacher should review the test with the students. In this way the review test becomes an important part of the learning process.

APPENDIX B

Anthropology Achievement Tests

- Directions for the Tests
- Pilot Anthropology Achievement Test
- Anthropology Achievement Test No. 1
- Anthropology Achievement Test No. 2
- Key to Anthropology Achievement Tests

Anthropology Curriculum Project
Cultural Change: The Changing World Today
Publication No. 72-4: Directions for Tests
April 1972

DIRECTIONS FOR THE TEST

Materials Required:

For each pupil --
- 1 test
- 1 answer sheet
- 1 pencil
- 1 eraser

In addition, for the teacher
- extra pencils
- extra copy of the test

Directions:

Provide a model on the chalkboard. List the school and the teacher's name.

SAY: If your pencil breaks or will not write, hold it up and I will give you another. Now look at the front of the answer sheet. At the top of the page there are lines for your name, teacher, and school. If you are a boy, circle boy. If you are a girl, circle girl. Fill in the information needed.

SAY: Look at the test booklet. Look at the first page where it says "General Directions."

Hold up a test and point to the general directions on the first page.

SAY: Read the general directions silently while I read them aloud. They say:

> This is a test of the understandings you have developed about cultural change. You should take the test in the same way you would work on any new and interesting problems. Here are a few suggestions which will help you earn your best score.

1. Make sure you understand the directions. If you do not understand any part of the directions, ask the teacher.

2. You will make your best score by answering every question because your score is the number of the correct answers you mark. Mark the answer you think is best.

SAY: Now look at the directions at the bottom of the page. The directions tell you what to do. Read the directions silently while I read them aloud. They say:

This is an Anthropology test. Read the question and select the best answer. Mark the answer 1, 2, or 3 on the answer sheet. Be certain that the number on the test is the same as the number on the answer sheet. You must mark all of your answers on the separate answer sheet you have been given. The test booklet should not be marked in any way. You must mark your answer sheet by blackening the space having the same letter as the answer you have chosen. For example:

SAMPLE A:

A. Which of the following is a toy?
    1. cat
    2. boy
    3. doll

Since a doll is a toy, you should choose the answer lettered 3. On your answer sheet, you would first find the row of spaces numbered the same as the question - in the sample above, it is A. Then you would blacken the space in this row with the same letter as the answer you have chosen. Mark the answer on your answer sheet.

Mark your answer heavy and black. Mark only one answer for each question. If you change your mind about an answer, be sure to erase the first mark completely. Then mark the answer you think is best.

Now look at Sample B.

SAMPLE B:

B. A dog can
    1. read
    2. bark
    3. sing

Which of the three words makes the sentence true?

Wait for the class to answer.

SAY: Yes, a dog can bark, the number for bark is 2. Find Sample B on the answer sheet. Blacken in the square numbered 2.

Check to make sure all pupils mark this sample correctly.

SAY: In each question on this page you are to write the number of the answer that you think is best. Are there any questions about what you are going to do?

Pause.

SAY: You will begin with question 1. You read each question and answers silently while I read them aloud. Choose the answer that you think is correct, and mark the number of your answer on the answer sheet.

Read each question aloud, and allow time between each question for the children to respond. At the end of the test period collect the test and test booklets.

Anthropology Curriculum Project
Cultural Change: The Changing World Today
Publication No. 72-4: Anthropology
April 1972

GENERAL DIRECTIONS

This is a test of the understandings you have developed about cultural change. You should take the test in the same way you would work on any new and interesting problems. Here are a few suggestions which will help you earn your best score.

1. Make sure you understand the directions. If you do not understand any part of the directions, ask the teacher.
2. You will make your best score by answering every question because your score is the number of the correct answers you mark. Mark the answer you think is best.

* * * *

DIRECTIONS

This is an Anthropology test. Read the question and select the best answer. Mark the answer 1, 2, or 3 on the answer sheet. Be certain that the number on the test is the same as the number on the answer sheet. You must mark all of your answers on the separate answer sheet you have been given. The test booklet should not be marked in any way. You must mark your answer sheet by blackening the space having the same letter as the answer you have chosen. For example:

SAMPLE A:

A. Which of the following is a toy?
   1. cat
   2. boy
   3. doll

SAMPLE B:

B. A dog can
   1. read
   2. bark
   3. sing

Anthropology Curriculum Project
Cultural Change: *The Changing World Today*
Publication No. 72-4: Anthropology
Pilot Anthropology Achievement Test
April 1972

The Changing World Today

Chapters 1 and 2

1. Man's way of living is called
    1. universals.
    2. culture.
    3. enculturation.

2. A culture is made up of many different objects and ways of believing. Each unit or part of culture is called a
    1. trait.
    2. diffusion.
    3. belief.

3. Knowing how to make things is part of
    1. universals.
    2. material traits.
    3. technology.

4. Some traits are found in all cultures, they are called
    1. technology.
    2. universals.
    3. trait variations.

5. Some traits can be seen or touched. Objects or things made by man are
    1. material traits.
    2. non-material traits.
    3. trait variations.

6. John speaks English. Jai speaks Korean. English and Korean are examples of
    1. material traits.
    2. technology.
    3. trait variations.

7. Most children in the United States learn to speak English. Learning to speak English in the United States is an example of
    1. enculturation.
    2. acculturation.
    3. diffusion.

8. Talking and writing are part of
    1. acculturation.
    2. material traits.
    3. language.

9. Food is a material trait. The way people eat is a
    1. cultural universal.
    2. non-material trait.
    3. stable culture.

10. All cultures change. Some cultures change slowly. A culture with little change is a
    1. stable culture.
    2. modern culture.
    3. cultural universal.

11. Tool making is found in all cultures. Tool making is a
    1. cultural universal.
    2. non-material trait.
    3. trait variation.

12. New traits both from within and from outside the culture are causes of
    1. stable cultures.
    2. cultural changes.
    3. cultural universals.

13. Pretend that one of your classmates found gold in a creek near his home. Finding the gold is an example of
    1. invention.
    2. diffusion.
    3. discovery.

14. A scientist combined a gasoline engine and a bicycle to make a motorcycle. The motorcycle is an example of
    1. invention.
    2. diffusion.
    3. discovery.

15. Before Europeans came to the new world, horses were not part of the culture of the Indians. After the Europeans came to the new world, the horse became part of the culture of the Indians. This is an example of
    1. diffusion.
    2. discovery.
    3. invention.

16. New traits are called
    1. discoveries.
    2. enculturation.
    3. innovations.

17. After World War II the Japanese and Americans lived in close contact. Americans learned new traits from the Japanese. The Japanese learned many American traits. This is an example of
    1. acculturation.
    2. enculturation.
    3. discovery.

18. Acculturation takes place only when cultures are
    1. far apart.
    2. in close contact.
    3. making new inventions.

19. A culture adds new traits mostly by
    1. diffusion.
    2. inventions.
    3. discoveries.

20. New traits that come from the people in the culture come by
    1. diffusion and acculturation.
    2. invention and discovery.
    3. enculturation and innovation.

21. New traits that come from other cultures come by
    1. diffusion and acculturation.
    2. invention and discovery.
    3. enculturation and innovation.

22. Learning one's own culture starts in the
    1. school.
    2. family.
    3. church.

23. Which example shows the highest level of technology?
    1. a man using a hoe to till the soil.
    2. a man using a tractor to pull the plow.
    3. a man using a horse to pull the plow.

24. A school desk is made by man. It is an example of
    1. a discovery.
    2. a non-material trait.
    3. a material trait.

25. Only man is able to
    1. use language.
    2. communicate.
    3. use signs.

26. Larry's father is teaching him to milk the cows. This is an example of
    1. diffusion.
    2. acculturation.
    3. enculturation.

27. An example of a material trait is a
    1. breeze.
    2. stone.
    3. pencil.

28. Most changes come to a culture as
    1. new traits are added.
    2. old traits are dropped.
    3. new discoveries are made.

29. Which would you expect to change more rapidly?
    1. family patterns.
    2. beliefs.
    3. technology and tools.

30. The Japanese have many material traits in their culture. From what you have learned about cultural change, would you expect the Japanese culture to
    1. change rapidly.
    2. change slowly.
    3. stay the same.

Anthropology Achievement Test One
The Changing World Today

Chapters 1 and 2

1. The way of life of a group of people is called
    1. universals.
    2. culture.
    3. enculturation.

2. Individual units or parts of culture are called
    1. traits.
    2. diffusion.
    3. beliefs.

3. The way things are made is part of
    1. universals.
    2. material traits.
    3. technology.

4. Traits that are found in all cultures are called
    1. technology.
    2. universals.
    3. variations.

5. The parts of culture that can be seen or touched are
    1. material traits.
    2. non-material traits.
    3. trait variations.

6. Most people in the United States speak English. Most people in Japan speak Japanese. English and Japanese are examples of
    1. material traits.
    2. technology.
    3. trait variations.

7. A Japanese child learning to speak Japanese is an example of
    1. enculturation.
    2. acculturation.
    3. diffusion.

8. Man's special way of passing on culture is
    1. technology.
    2. acculturation.
    3. language.

9. A church is a building. It is used for worship. A church is a material trait. Going to church is a
    1. cultural universal.
    2. non-material trait.
    3. stable culture.

10. A culture that changes slowly is a
    1. stable culture.
    2. modern culture.
    3. cultural universal.

11. Music is found in all cultures. Music is a
    1. cultural universal.
    2. part of technology.
    3. material trait.

12. Discovery, invention, diffusion, and acculturation are causes of
    1. stable cultures.
    2. cultural change.
    3. cultural universals.

13. James Marshall found gold in California. Finding the gold is an example of
    1. invention.
    2. diffusion.
    3. discovery.

14. Robert Fulton combined a steam engine and a boat to make a steamboat. The steamboat is an example of
    1. invention.
    2. diffusion.
    3. discovery.

15. English traders traded steel knives for animal furs. The steel knife became a part of Indian cultures. This is an example of
    1. diffusion.
    2. discovery.
    3. invention.

16. New traits that come from within and outside the culture are called
    1. discoveries.
    2. acculturation.
    3. innovations.

17. Along the Rio Grande River, people in the United States and Mexico are close to one another. Mexicans have brought their traits to the United States. Americans have brought their traits to Mexico. This is an example of
    1. acculturation.
    2. enculturation.
    3. discovery.

18. Acculturation takes place when two cultures share cultural traits as a result of
    1. stable cultures.
    2. cultural contact.
    3. innovation.

19. Most new traits come to a culture as a result of
    1. diffusion.
    2. inventions.
    3. discoveries.

20. Changes that come from within the culture come by
    1. diffusion and acculturation.
    2. invention and discovery.
    3. enculturation and innovation.

21. Changes that come from outside the culture come by
    1. diffusion and acculturation.
    2. invention and discovery.
    3. enculturation and innovation.

22. A child first begins to learn the ways of his culture from his
    1. school.
    2. family.
    3. church.

23. Which example shows the highest level of technology?
    1. A man rowing a canoe.
    2. An atomic submarine.
    3. A sailboat.

24. A pencil is made by man. It is an example of
    1. a discovery.
    2. a non-material trait.
    3. a material trait.

25. Only man
    1. has language.
    2. communicates.
    3. uses signs.

26. Mary's mother is teaching her how to bake a cake. This is an example of
    1. diffusion.
    2. acculturation.
    3. enculturation.

27. An example of a material trait is a
    1. rock.
    2. wave.
    3. bicycle.

28. A culture changes mostly by
    1. adding new traits.
    2. dropping old traits.
    3. making new discoveries.

29. Which would you expect to change more rapidly?
    1. religious practices.
    2. traditions.
    3. clothing styles.

30. Culture A has many traits. Culture B has few traits. From what you have learned about cultural change
    1. Culture A will have more changes than Culture B.
    2. Culture B will have more changes than Culture A.
    3. both cultures will have about the same amount of change.

Anthropology Curriculum Project
Cultural Change: The Changing World Today
Publication Number 72-4: Anthropology
Achievement Test Number 2
May 1972

The Changing World Today

Chapters I, II and III

1. Tokyo is a large city. City areas are
    1. rural areas.
    2. urban areas.
    3. agricultural areas.

2. John speaks English. Tai speaks Korean. English and Korean are examples of
    1. material traits.
    2. technology.
    3. trait variations.

3. The Japanese have many material traits in their culture. The Japanese culture is
    1. changing rapidly.
    2. changing slowly.
    3. staying about the same.

4. Japan sells many goods to the United States. When Japan sells goods to the United States it is
    1. importing.
    2. manufacturing.
    3. exporting.

5. The Japanese now live longer than ever before. One of the reasons why the Japanese live longer is because of
    1. manufacturing.
    2. modern medicines.
    3. urbanization.

6. Talking and writing are part of
    1. acculturation.
    2. diffusion.
    3. language.

7. To use new methods in the place of old methods is called
    1. modernization.
    2. urbanization.
    3. industrialization.

8. The Japanese chose traits from other countries that they thought would help them modernize. Choosing traits from other countries and making them part of the Japanese culture is an example of
   1. selective diffusion.
   2. urbanization.
   3. industrialization.

9. Which example best shows modernization?
   1. painting beautiful pictures with great skill.
   2. building new passenger trains.
   3. visiting a shrine built long ago.

10. Man's way of living is called
    1. acculturation.
    2. culture.
    3. enculturation.

11. To buy goods from other countries is called
    1. importing.
    2. manufacturing.
    3. exporting.

12. New traits that come both from within and from outside the culture are causes of
    1. stable cultures.
    2. cultural changes.
    3. cultural universals.

13. Before Europeans came to the new world, horses were not part of the culture of the Indians. After the Europeans came to the new world, the horse became part of the culture of the Indians. This is an example of
    1. diffusion.
    2. discovery.
    3. invention.

14. Which example shows the highest level of technology?
    1. a man using a hoe to till the soil.
    2. a man using a tractor to pull the plow.
    3. a man using a horse to pull the plow.

15. Larry's father is teaching Larry to drive the car. This is an example of
    1. diffusion.
    2. acculturation.
    3. enculturation.

16. An example of industrialization is
    1. making beautiful pots by hand.
    2. making motorcycles in a factory.
    3. shopping in the city.

17. Chemicals from the factory made the river impure. Fish could no longer live in the river. The river is
    1. productive.
    2. isolated.
    3. polluted.

18. Pretend that one of your classmates found gold in a creek near his home. Finding the gold is an example of
    1. invention.
    2. diffusion.
    3. discovery.

19. The cities of Japan grew larger as villagers moved to the cities to work in the factories. Farmers and villagers moving to the cities is one cause of
    1. urbanization.
    2. industrialization.
    3. selective diffusion.

20. All cultures change. Some cultures change slowly. A culture with little change is a
    1. stable culture.
    2. modern culture.
    3. cultural universal.

21. Only man is able to
    1. use language.
    2. communicate.
    3. use signs.

22. A school desk is made by man. The school desk is an example of
    1. a discovery.
    2. a non-material trait.
    3. a material trait.

23. The number of people who live in Japan is increasing. The word that means the number of people is
    1. urbanization.
    2. population.
    3. economics.

24. New traits in a culture that come from the people of other cultures are a result of
    1. diffusion and acculturation.
    2. invention and discovery.
    3. enculturation and innovation.

25. Changing iron ore into steel is an example of
    1. manufacturing.
    2. exporting.
    3. urbanization.

26. New traits in a culture that come from the people of the culture are a result of
    1. diffusion and acculturation.
    2. invention and discovery.
    3. enculturation and innovation.

27. Building ships, automobiles, and television sets are examples of Japan's high level of
    1. urbanization.
    2. technology.
    3. isolation.

28. City areas in Japan are growing rapidly. The growth of city areas is called
    1. industrialization.
    2. manufacturing.
    3. urbanization.

29. A scientist combined a gasoline engine and a bicycle to make a motorcycle. The motorcycle is an example of
    1. invention.
    2. diffusion.
    3. discovery.

30. As Japan changed from using mainly manpower to machine power to make things, Japan became more
    1. agricultural.
    2. isolated.
    3. industrialized.

TEST KEY

	Anthropology Achievement Test Number 1 and Pilot Test	Anthropology Achievement Test Number 2
1.	2	2
2.	1	3
3.	3	1
4.	2	3
5.	1	2
6.	3	3
7.	1	1
8.	3	1
9.	2	2
10.	1	2
11.	1	1
12.	2	2
13.	3	1
14.	1	2
15.	1	3
16.	3	2
17.	1	3
18.	2	3
19.	1	1
20.	2	1
21.	1	1
22.	2	3
23.	2	2
24.	3	1
25.	1	1
26.	3	2
27.	3	2
28.	1	3
29.	3	1
30.	1	3

APPENDIX C

Comparison of the Characteristics of Pilot and Experimental Teachers

TABLE 9

Comparison of Characteristics of the Pilot and Experimental Teachers

	Pilot Teachers	Experimental Teachers
Number	4	20
Age Distribution	Mdn. 34.5	Mdn. 38
Sex Distribution	4 Female (100%)	18 Female (90%) 2 Male (10%)
Teaching Experience	Mdn. 6 years	Mdn. 15.5 years
Professional Training	2 BA (50%) 2 MS (50%)	19 BA (95%) 1 MS (5%)
Training in Anthropology	2 teachers with 5 hours of anthropology	1 teacher with 10 hours of anthropology
	2 teachers with no anthropology	19 teachers with no anthropology

APPENDIX D

Comparison of Word Meaning Knowledge Mean Scores of the Pilot and Experimental Groups as Measured by the Stanford Achievement Test, Primary II, Form W Reading Test

TABLE 10

Comparison of Word Meaning Knowledge Mean Scores of the Pilot and Experimental Groups as Measured by the Stanford Achievement Test, Primary II, Form W Reading Test

Group	Variables		
	No. of Students	Raw Score Mean	Grade Placement
Pilot Group	116	23.61	3.5
Experimental Group	565	19.08	2.9

APPENDIX E

Item Information From Pilot Test

TABLE 11

Item Information from Pilot Test

Item Number	Difficulty	Point Biserial Correlation of Items With Total Test Score	Concept Tested
1*(a)	.86	.30	culture
2	.76	.28	traits
3	.81	.52	technology
4	.41	.49	cultural universal
5	.64	.54	material trait
6*	.46	.51	trait variation
7	.40	.52	enculturation
8*(a)	.79	.16	language
9	.54	.27	non-material trait
10*	.55	.65	cultural change
11	.39	.42	cultural universal
12*(b)	.69	.39	cultural change
13*	.82	.46	discovery
14*	.70	.62	invention
15*	.65	.54	diffusion
16	.66	.38	innovation
17	.43	.62	acculturation
18	.55	.50	acculturation
19	.33	.37	diffusion
20*(b)	.53	.30	discovery and invention
21*(b)	.50	.36	diffusion and acculturation
22	.71	.49	enculturation

[a] An attempt was made to improve questions by changing the distractors.

[b] An attempt was made to improve the questions by rewording the stem.

*Items selected from the pilot test to be used in the final examination of students in the experimental treatment population (Anthropology Achievement Test No. Two).

TABLE 11 (Cont'd)

Item Number	Difficulty	Point Biserial Correlation of Items With Total Test Score	Concept Tested
23*	.69	.45	technology
24*	.63	.44	material trait
25*	.54	.35	culture (language)
26*(b)	.44	.53	enculturation
27	.64	.51	material trait
28	.51	.38	cultural change
29	.42	.21	cultural change
30*(b)	.44	.44	cultural change

[a] An attempt was made to improve questions by changing the distractors.

[b] An attempt was made to improve the questions by rewording the stem.

*Items selected from the pilot test to be used in the final examination of students in the experimental treatment population (Anthropology Achievement Test No. Two).

APPENDIX F

Statistical Characteristics for Anthropology Achievement Tests

- Pilot Anthropology Achievement Test
- Anthropology Achievement Test No. 1
- Anthropology Achievement Test No. 2

TABLE 12

Statistical Characteristics of Pilot Anthropology Achievement Test

Variables					
Pilot Class Number	Class Size	Mean	Reliability Coefficient (KR-20)	Standard Deviation	Standard Error of Measurement of the Mean
1	26	20.38	.92	7.40	.41
2	28	12.79	.69	4.25	.45
3	26	17.69	.73	4.60	.47
4	26	19.50	.89	5.16	.33
All Classes Combined	106	17.50	.85	6.71	.23

TABLE 13

Statistical Characteristics of Anthropology Achievement Test
Number One for Three Randomly Selected Classes

Variables						
Treatment	Treatment Class Number	Class Size	Mean	Reliability Coefficient (KR-20)	Standard Deviation	Standard Error of Measurement of the Mean
Pre-organizer	6	28	15.57	.72	4.60	.46
Post-organizer	7	26	12.77	.50	3.49	.48
No-organizer	17	28	17.18	.74	4.70	.45
All Classes Combined		82	15.23	.71	4.63	.27

TABLE 14

Statistical Characteristics of Anthropology Achievement Test
Number Two - By Class

	Variables					
Treatment	Treatment Class Number	Class Size	Mean	Reliability Coefficient (KR-20)	Standard Deviation	Standard Error of Measurement of the Mean
Pre-organizer	1	21	13.81	.70	4.19	.49
	2	25	20.44	.69	3.87	.42
	3	27	17.15	.52	3.60	.48
	4	30	18.97	.82	5.53	.42
	5	32	20.36	.79	4.90	.39
	6	27	17.81	.39	3.11	.47

TABLE 14 (Cont'd)

Treatment	Treatment Class Number	Class Size	Mean	Reliability Coefficient (KR-20)	Standard Deviation	Standard Error of Measurement of the Mean
Post-organizer	7	27	13.92	.67	4.25	.47
	8	27	20.37	.81	4.97	.41
	9	29	20.28	.77	4.69	.41
	10	17	17.88	.78	5.06	.57
	11	21	13.57	.66	4.18	.53
	12	26	13.96	.51	3.49	.48
	13	25	13.32	.70	4.50	.49

TABLE 14 (Cont'd)

Treatment	Treatment Class Number	Class Size	Mean	Reliability Coefficient (KR-20)	Standard Deviation	Standard Error of Measurement of the Mean
No-organizer	14	26	16.62	.73	4.70	.47
	15	19	22.16	.73	3.55	.41
	16	23	20.57	.87	5.87	.44
	17	27	19.74	.80	5.02	.43
	18	29	15.90	.53	3.55	.45
	19	25	11.68	.54	3.55	.48
	20	29	14.07	.18	2.87	.48
All Classes Combined		512	17.13	.78	5.24	.11

APPENDIX G

Random Assignment of Teacher By School

Random Assignment of Teacher By School

Group	School A	School B	School C
Pre-Organizer			
Teacher 1			x
Teacher 2			x
Teacher 3	x		
Teacher 4		x	
Teacher 5		x	
Teacher 6		x	
Post-Organizer			
Teacher 7			x
Teacher 8			x
Teacher 9	x		
Teacher 10			x
Teacher 11	x		
Teacher 12		x	
Teacher 13	x		
No Organizer			
Teacher 14			x
Teacher 15			x
Teacher 16			x
Teacher 17		x	
Teacher 18		x	
Teacher 19	x		
Teacher 20	x		

APPENDIX H

Class Size, Word Knowledge Mean Scores and Standard Deviation of Reading Scores for the Experimental Population by Treatment Groups and Classes

TABLE 15

Class Size, Word Knowledge Mean Scores and Standard Deviation of Reading Scores for the Experimental Population by Treatment Groups and Classes

Group	Reading Scores		
	Number of Students	Mean Raw Score	Standard Deviation
Pre-organizer Group	181	21.32	8.52
Class 1	25	18.80	6.46
Class 2	26	24.32	6.38
Class 3	31	17.41	5.26
Class 4	33	24.24	7.42
Class 5	33	25.67	9.80
Class 6	33	17.45	8.14
Post-organizer Group	187	18.67	7.54
Class 7	25	15.76	7.63
Class 8	27	23.40	8.90
Class 9	31	22.03	4.55
Class 10	23	17.90	9.65
Class 11	25	14.16	6.06
Class 12	30	23.10	6.22
Class 13	26	14.36	5.44
No organizer Group	197	17.57	8.25
Class 14	26	19.35	7.39
Class 15	23	24.17	7.32
Class 16	26	21.54	7.94
Class 17	32	16.72	9.00
Class 18	33	16.52	7.37
Class 19	28	10.54	4.77
Class 20	29	14.17	6.20
All Groups	565	19.19	8.90

APPENDIX I

Table of Test Specifications

- Anthropology Achievement Test No. 1
- Anthropology Achievement Test No. 2

TABLE 16

Table of Specifications for Anthropology Achievement Test Number One

Question	Concept	Specifications			Percentage getting item correct. Based on sample of three randomly selected classes.
		Definition	Example	Application	
1	culture	x			71
2	traits	x			57
3	technology	x			54
4	cultural universals	x			42
5	material traits	x			43
6	trait variations		x		50
7	enculturation			x	33
8	language	x			68
9	non-material trait			x	32
10	cultural change	x			27
11	cultural universal			x	32
12	cultural change	x			59
13	discovery			x	72
14	invention			x	74
15	diffusion			x	48
16	innovation	x			49
17	acculturation			x	37
18	acculturation	x			55

TABLE 16

Table of Specifications for Anthropology Achievement Test Number One (Cont'd)

		Specifications			
Question	Concept	Definition	Example	Application	Percentage getting item correct. Based on sample of three randomly selected classes.
19	diffusion	x			37
20	discovery and invention	x			27
21	diffusion and acculturation	x			37
22	enculturation		x		95
23	technology			x	55
24	material trait			x	50
25	culture (language)	x			68
26	enculturation			x	45
27	material trait			x	57
28	cultural change	x			49
29	cultural change			x	71
30	cultural change			x	33
	Number of items	15	2	13	
	Percent of items	50%	7%	43%	

TABLE 17

Table of Specifications for Anthropology Achievement Test Number Two

		Specifications			
Question	Concept	Definition	Example	Application	Percentage getting item correct. Based on data from the total treatment population.
1	urban areas	x			65
2	trait variations		x		49
3	cultural change		x		45
4	exporting		x		51
5	modernization		x		71
6	language	x			71
7	modernization	x			60
8	selective diffusion		x		63
9	modernization		x		60
10	culture	x			74
11	importing	x			47
12	cultural change	x			36
13	diffusion			x	36
14	technology			x	73
15	enculturation			x	47
16	industrialization			x	58
17	industrialization (pollution)		x		89
18	discovery			x	75

TABLE 17

Table of Specifications for Anthropology Achievement Test Number Two (Cont'd)

Question	Concept	Specifications			Percentage getting item correct. Based on data from the total treatment population.
		Definition	Example	Application	
19	urbanization		x		39
20	cultural change	x			48
21	culture (language)	x			70
22	material trait			x	54
23	population	x			61
24	diffusion and acculturation	x			40
25	manufacturing		x		65
26	invention and discovery	x			28
27	technology		x		73
28	urbanization	x			53
29	invention			x	59
30	industrialization		x		59
	Number of items	12	10	8	
	Percent of items	40%	33%	27%	

APPENDIX J

Summary of Test Data

- Summary of Raw Mean Scores and Adjusted Mean Scores
- Word Knowledge: Reading
- Anthropology Achievement Test No. 1
- Anthropology Achievement Test No. 2

TABLE 18

Summary of Raw Mean Scores and Adjusted Mean Scores - Third Grade

Test	Treatment		
	Pre-organizer	Post-organizer	No-organizer
Word Meaning as Measured by the Stanford Achievement Test	21.32	18.67	17.37
Anthropology Achievement Test One - Raw Mean Score	15.30	15.33	15.33
Anthropology Achievement Test One - Adjusted Mean Score	14.35	15.51	15.97
Anthropology Achievement Test Two - Raw Mean Score	18.09	16.19	17.25
Anthropology Achievement Test Two - Adjusted Mean Score	16.73	16.43	18.16

Word Knowledge: Reading

Summary of Data

Pre-Organizer		Post-Organizer		No Organizer	
Class	Raw Score Mean	Class	Raw Score Mean	Class	Raw Score Mean
1	18.80	7	15.76	14	19.35
2	24.32	8	23.40	15	24.17
3	17.41	9	22.03	16	21.54
4	24.24	10	17.90	17	16.72
5	25.67	11	14.10	18	16.52
6	17.45	12	23.10	19	10.54
		13	14.36	20	14.17
ΣX_1	= 127.89	ΣX_2	= 130.71	ΣX_3	= 123.01
ΣX_1^2	= 2799.0395	ΣX_2^2	= 2541.99	ΣX_3^2	= 2286.93
$(\Sigma X_1)^2$	= 16355.85	$(\Sigma X_2)^2$	= 17085.10	$(\Sigma X_3)^2$	= 15131.46

Anthropology Achievement Test Number 1

Summary of Data

Pre-Organizer		Post-Organizer		No Organizer	
Class	Raw Score Mean	Class	Raw Score Mean	Class	Raw Score Mean
1	12.33	7	12.81	14	15.46
2	16.11	8	17.19	15	18.52
3	14.87	9	17.29	16	17.42
4	17.45	10	17.41	17	17.14
5	15.45	11	15.90	18	14.94
6	15.61	12	16.07	19	10.71
		13	10.65	20	13.12
ΣX_1	= 91.82	ΣX_2	= 107.32	ΣX_3	= 107.31
ΣX_1^2	= 1419.56	ΣX_2^2	= 1686.12	ΣX_3^2	= 1689.28
$(\Sigma X_1)^2$	= 8430.91	$(\Sigma X_2)^2$	= 11515.44	$(\Sigma X_3)^2$	= 11515.44

Anthropology Achievement Test Number 2

Summary of Data

Pre-Organizer		Post-Organizer		No Organizer	
Class	Raw Score Mean	Class	Raw Score Mean	Class	Raw Score Mean
1	13.81	7	13.93	14	16.62
2	20.44	8	20.37	15	22.16
3	17.15	9	20.28	16	20.57
4	18.97	10	17.88	17	19.74
5	20.36	11	13.57	18	15.90
6	17.81	12	13.96	19	11.68
		13	13.32	20	14.07
ΣX_1	= 108.54	ΣX_2	= 113.31	ΣX_3	= 120.74
ΣX_1^2	= 1994.24	ΣX_2^2	= 1896.40	ΣX_3^2	= 2167.28
$(\Sigma X_1)^2$	= 11780.93	$(\Sigma X_2)^2$	= 14578.15	$(\Sigma X_3)^2$	= 14578.15

APPENDIX K

Pre-organizer Treatment Material